

BULLETIN OF MISCELLANEOUS INFORMATION No. 4 1926 ROYAL BOTANIC GARDENS, KEW

XXI.—REVISION OF THE GENUS *CALYCOLPUS*. L. A. M. RILEY.

The genus *Calycolpus* (*Myrtaceae*, tribe *Myrteae*) was established by Berg for the reception of a group of Tropical American species which had been assigned erroneously by previous authors to the genera *Campomanesia*, *Myrtus*, and *Psidium*. It may be distinguished from these genera by its sepals, which are patent in the flower-bud, whereas in *Campomanesia* and *Myrtus* they are appressed to the corolla when in bud, and in *Psidium* they form a closed calyx which splits into segments as the flower expands.

Berg's original account of *Calycolpus* was prepared for, and eventually appeared in, Martius, *Flora Brasiliensis*, xiv. pars 1, 411, but the fascicle in which it was included was not published until May 1857, and in the meantime Berg's "Revisio Myrtacearum Americae", which contained a slightly abbreviated generic description of *Calycolpus* and descriptions of additional species, had appeared in *Linnaea*, vol. xxvii. As the Brazilian genera and species of *Myrteae* in Berg's "Revisio" were cited by him from the *Flora Brasiliensis*, with the generic and specific running numbers employed in that work, but without references to the pages, it is obvious that at the time when Berg prepared his "Revisio" his account of the *Myrtaceae* for the *Flora Brasiliensis* had been completed but was not yet in type.

The actual date of publication of *Calycolpus* is a little uncertain. The title-page of *Linnaea*, vol. xxvii. bears the date "1854", but this is obviously incorrect since the volume contains (pp. 473-552) a paper on plants cultivated at Halle during the year 1855. In *Flora*, 1857, 285, there is the following entry: "*Linnaea*, Band xxvii. Heft 1-6. 1855"; and in *Bot. Zeit.* 1857, 27, the entry: "*Linnaea*, Band xxvii. Heft 1-6. 1856". As the title-page bears the date 1854, and as pp. 473 onwards can hardly have been published before 1856, the various parts of the volume probably appeared at different dates during the period 1854-56. Pfeiffer* gives the date of publication of *Calycolpus* as "1856", and, as he is generally accurate, this date is accepted provisionally in the present paper.

Neither in the *Flora Brasiliensis* nor in *Linnaea*, xxvii. did Berg indicate a type-species of *Calycolpus*. If he actually regarded any species as a type, which is uncertain, it was presumably one of the three described in the *Flora Brasiliensis*, as his manuscript for that work was completed before the manuscript of his "Revisio",

* *Nomenclator Botanicus*, i. 555 (1873).

although the latter appeared first. The choice accordingly lies between *C. glaber*, *C. Goetheanus*, and *C. calophyllus*. *C. calophyllus* is the most egregious member of the genus, and may be dismissed as being quite untypical on account of the poorly-developed calyx-lobes. Of the two remaining species *C. Goetheanus* was not only the first described*, but was the one figured by Berg in *Flora Brasiliensis*. Berg, furthermore, mentioned how *C. glaber* differed from *C. Goetheanus*†, thus implying that the latter was more typical or, alternatively, better known. He also distinguished *C. Schomburgkianus* and *C. Warszewiczianus* from *C. Goetheanus*‡, which might suggest that he regarded that species as a standard. Hence *C. Goetheanus* is here proposed as the standard-species.

So far as I can ascertain, no systematic work on the genus has been published since 1857. During that period much additional material has been collected. I have found it necessary to reduce two of Berg's original species (*C. ovalifolius* and *C. Schomburgkianus*), while I have treated his variety *gracilis* of *C. Kegelianus* as of specific rank. I have described five additional species myself, bringing the total number of species now recognized in the genus *Calycolpus* to twelve.

The genus inhabits exclusively river valleys and low country. The focus is situated in north-eastern South America, especially the Guianas, two species being peculiar to British Guiana, three to Dutch Guiana, and one to French Guiana. Two are confined to the neighbourhood of Pará in Brazil. The most widely distributed member of the genus, *C. glaber*, ranges from Trinidad to the district of Maranhao in Brazil and occurs in all the Guianas, thus including eight species out of the other eleven within its range. There are three outlying species. *C. Goetheanus* is known hitherto only from the Rio Negro; *C. calophyllus* is from the Rio Uaupès and the Rio Guainia, tributaries of the Rio Negro, and from Maypures on the Upper Orinoco; and *C. Warszewiczianus* is peculiar to Panama, being the only species occupying, geographically, a really isolated position.

My thanks are due to the Director of Kew for facilities in preparing this revision, and to the Keeper of the Department of Botany at the British Museum, the Conservator of the Botanic Garden, Brussels, and the Conservators of the University Herbaria at Utrecht and Göttingen, for enabling me to examine type and other specimens. I have also received material assistance from Mr. T. A. Sprague, of Kew, in preparing the account of the publication of the genus.

CLAVIS SPECIERUM.

1. Lobi calycis rotundati, ciliati, ovario
breviares.....(1) *calophyllus*.

* *Myrtus Goetheana* Mart. ex DC. Prodr. iii. 240 (1828).

† Mart. Fl. Bras. xiv. pars 1, 412 (1857).

‡ Linnaea, xxvii. 381, 383 (1856).

- Lobi calycis obtusi vel acuti, haud ciliati,
- ovarium aequantes vel superantes2.
2. Lobi calycis quam lati bis longi vel ultra,
plerumque acuti3.
- Lobi calycis longi quam lati vel parum
longiores, plerumque obtusi10.
3. Folia supra pilosa, nervis et rete venularum
occultis; ramuli argute alati(2) *chnoioophyllus*.
4. Folia supra glabra4.
- Folia subtus insigniter reticulata, circiter
10 cm. longa, 4 cm. lata; lobi calycis
circiter bis longi quam lati(11) *glaber*, var. *angustilobus*.
Folia subtus haud manifeste vel ad margines
tantum reticulata5.
5. Folia supra nitida et in sicco fere nigra;
lobi calycis saepe obtusi et vix bis longi
quam lati(9) *Goetheanus*.
Folia supra opaca; lobi calycis plerumque
multo longiores quam lati6.
6. Ramuli quadrangulati et conspicue alati;
lobi calycis 0.7-1 cm. longi, multo longiores
quam lati7.
- Ramuli teretes vel subangulati, rarius
versus apicem quadrangulati et alati;
lobi calycis 5-8 mm. longi8.
7. Lobi calycis 8-10 mm. longi; ovarium in
alabastro subglobosum, glabrum vel sub-
glabrum; folia subrotundata vel late
elliptica, haud ultra 6.5 cm. longa9.
- Lobi calycis 7-8 mm. longi; ovarium in
alabastro pyriforme, pilosum praecipue
versus basin; folia ad 10 cm. longa,
plerumque anguste elliptica(5) *pyrifer*.
8. Ramuli erecti; nervi laterales foliorum
crebre paralleli, utrinsecus 25-30, sed
saepe vix manifesti; pedicelli 1-2 cm.
longi vel ultra(6) *Warszewiczianus*.
Ramuli fere sub angulo recto patentes;
nervi laterales foliorum inaequaliter dis-
positi, utrinsecus circiter 20, subtus
plerumque conspicui; pedicelli vix 1 cm.
longi(7) *gracilis*.
9. Folia basi rotundata vel cordata, supra
obscura; pedicelli 1.2-1.5 cm. longi;
lobi calycis circiter 8 mm. longi, 3 mm.
lati(4) *Kegelianus*.
Folia basi cuneata vel acute cuneata, satis
concoloria; pedicelli 1.5-2.5 cm. longi;
lobi calycis 10 mm. longi, 3 mm. lati(3) *megalodon*.

10. Folia subrotundata, 2-3.5 cm. longa, marginibus valde revolutis, rete venularum vix manifesto; ramuli pererecti(12) *revolutus*.
 Folia ovata vel lanceolata, 4.5-10 cm. longa vel ultra, marginibus haud valde revolutis, rete venularum conspicuo; ramuli haud conspicue erectiII.
11. Folia lanceolata, haud ultra 7 cm. longa, basi subacuta, nervis lateralibus utrinsecus ultra 20 regulariter subparallelis(8) *angustifolius*.
 Folia ovata vel ovato-lanceolata, usque ad 15 cm. longa, rarissime infra 7 cm. longa, basi cordata, rotundata, obtusa, vel rarius acuta, nervis lateralibus utrinsecus circiter 20 subirregulariter dispositis12.
12. Folia basi cordata vel rotundata, rarissime cuneata; pedicelli 2-4 cm. longi(10) *cordatus*.
 Folia basi haud cordata nec rotundata; pedicelli ad 7 cm. longi(11) *glaber*.

1. **C. calophyllus** (H.B.K.) Berg in Linnaea, xxvii. 381 (1856), et in Mart. Fl. Bras. xiv. pars 1, 412 (1857).—*Myrtus calophylla* H.B.K. Nov. Gen. et Sp. vi. 133 (1823); DC. Prodr. iii. 239 (1828). VENEZUELA: Maypures, fl. March. *Humboldt and Bonpland* (type); River Guainia, fl. May, *Spruce* 3511. BRAZIL: near Panurè on the river Uaupès, *Spruce* 2670.

I have not seen the type of this species, but Spruce's specimens cited above agree with the original description. According to Spruce's field notes, no. 3511 is a branched tree 20 feet high with a deciduous red bark. The flowers are pink outside and white within.

2. **Calycolpus chnoïophyllus** Riley, sp. nov.

Ramuli argute quadrangulares, alati, 3.5 mm. diametro (alis inclusis) 15 cm. infra apicem, brunnei vel cinerascens, pilosiusculi. *Folia* ovato-oblonga vel ovato-lanceolata, 5-7 cm. longa, 2-3.5 cm. lata, acute cuspidato-acuminata, rarius gradatim acuminata, basi obtusa vel rotundata, margine revoluta, costa supra impressa subtus elevata, nervis et venulis utrinque vix visibilibus, supra cinerea, pilosa, veteriora glabrescentia, subtus fusca, glabra vel sparsissime pilosa; petioli 3-5 mm. longi, pilosi, in alas desinentes. *Flores* axillares, solitarii; pedicelli 0.6-1.4 cm. longi, subcomplanati, pilosiusculi, apice incrassati; bracteolae minutae, triangulatae. *Lobi calycis* e basi latiori oblongi, obtusi, 8 mm. longi, 2 mm. lati, basi 3.5-4 mm. lato, pilosiusculi, intus basi dense pilosi. *Petala* circiter 1 cm. longa, 7 mm. lata, ciliata. *Ovarium* cupulatum, 5 mm. diametro, pilosum praecipue basi, 4-loculare; stylus 8 mm. longus, glaber, subcapitatus. *Fructus maturus* non visus.

BRITISH GUIANA: Upper Demerara River, fl. Sept., *Jenman* 4137 (type in Herb. Kew.).

On the type sheet of this species is the following note by N. E. Brown:—" = *Abraham* 313 along the Berbice-Rupununi Cattle Trail, in New York Herb. compared April 6, 1923".

3. *Calycolpus megalodon* Riley, sp. nov.

Ramuli erecti, argute quadrangulati vel alati, 2.5 mm. diametro 15 cm. infra apicem, fusco-cinerei, glabri, internodiis 2.5-3.5 cm. longis. *Folia* late elliptica, 4.5-6.5 cm. longa, 2-3.5 cm. lata, valde et acute acuminata, basi cuneata saepe acute cuneata, marginibus subrevolutis, coriacea, glabra, satis concoloria, opaca, nervis lateralibus utrinsecus 20-25 patentibus subparallelis utrinque haud conspicuis, rete venularum vix manifesta; petioli 1.5-2.5 mm. longi, supra sparse pilosi. *Flores* solitarii; pedicelli 1.5-2.5 cm. longi, teretes, apice vix incrassati, glabri; bracteolae subulatae, 1-1.5 mm. longae, pilosiusculae. *Lobi calycis* anguste ovati, ad apicem gradatim angustati, 1 cm. longi, fere 4 mm. lati, acuti, utrinque glabri basi intus dense et breviter pilosa excepta. *Ovarium* cupulatum, 4 mm. altum, 5 mm. diametro, glabrum vel subglabrum, 5-loculare, ovulis in quoque loculo circiter 10; stylus 1.2 cm. longus, glaber, obtusus.—*C. Goetheanus* Sagot in Ann. Sci. Nat. sér. 6, xx. 181 (1885), non Berg.

FRENCH GUIANA: Karouany, *Sagot* 215 (type in Herb. Kew.).

4. *C. Kegelianus* Berg in Linnaea, xxvii. 381 (1856), excl. var. *gracilis*; Pulle, Enum. Pl. Surinam, 335, excl. var. *gracilis*.—*C. Kegelianus* var. *robustus* Berg. l.c.

DUTCH GUIANA: sandy savannahs at Pará, *Wulfschaegel* (type in Herb. Brux.).

Berg recognized two varieties of his *C. Kegelianus*: α *robustus* and β *gracilis*. I have seen the type specimens of both and I consider them specifically distinct. I have retained the name *Kegelianus* for the var. *robustus*, as Berg's description of this variety is much more ample than his description of var. *gracilis*. Furthermore in the case of a species completely divided into varieties the var. α may usually be regarded as the type.

5. *Calycolpus pyrifer* Riley, sp. nov.

Arbor parva, 3 m. alta. *Ramuli* erecti, quadrangulati, superne alati, 2.25 mm. diametro 15 cm. infra apicem, fusci, glabri, internodiis 1.3-3.5 cm. longis. *Folia* elliptica vel oblongo-elliptica, 5.5-9.5 cm. longa, 2.2-3.8 cm. lata, longe et acute acuminata, basi oblique obtusa, marginibus revolutis, coriacea, glabra, nitidula, supra cinerea, subtus fusca, nervis lateralibus utrinsecus circiter 20 supra haud conspicuis subtus satis manifestis; petioli 2-3.5 mm. longi. *Flores* in axillis solitarii vel bini; pedicelli 0.8-1.3 cm. longi, complanati, superne incrassati, glabri vel summo tantum pilosi; bracteolae anguste triangulatae, acutae, 1.75-2 mm. longae. *Lobi calycis* anguste triangulati, 7.5-8 mm.

longi, basi 3 mm. lati, subacuti, utrinque pilosiusculi praecipue basi. *Petala* circiter 1.2 cm. longa, 1.1 cm. lata, utrinque pilosiuscula. *Ovarium* in alabastro pyriforme, 4 mm. longum, 4.5 mm. diametro, sparse pilosum, 5-loculare; ovula in quoque loculo circiter 11, plerumque oblonga, fere 0.5 mm. longa. *Fructus* haud visus.

BRITISH GUIANA: Corentyne River, Sandridge Woods, fl. Oct., *Jenman* 477 (type in Herb. Kew.); Essequibo, Ikuraka Lake, fl. Oct., *Altson* 158.

6. **C. Warszewiczianus** Berg in *Linnaea*, xxvii. 382 (1856).—*C. glaber* Hemsl. *Biol. Centr.-Amer. Bot.* i, 407, partim, non Berg.

PANAMA: in meadows near the city of Panama, *Seemann* 282; Chagres, hilly region, fr. Feb., *Fendler* 105; near Panama, fl. Sept., *Sutton Hayes* 404; in woods near Rio Grande Station, fl. and fr. Jan., *Sutton Hayes* 472; without precise locality, *Barclay* (Mus. Brit.).

A shrub or small tree 5–20 ft. high with rose-coloured flowers.

I have identified the above specimens from Berg's description. The type, which I have not seen, was collected by Warszewicz "in America australi" according to Berg. Warszewicz travelled extensively in Central America, visiting Panama among other countries, and, in view of the close agreement of the above specimens with Berg's description, it seems probable that Panama is the country whence the type came.

There is, in the Kew Herbarium, a sheet of *Calycolpus* bearing the legend "Sellow, S. Brazil" in Sir William Hooker's writing. This specimen is specifically quite indistinguishable from the rest of the material I have cited. In view of the apparent discontinuity of distribution, and especially as Berg cites no specimen of Sellow under the genus *Calycolpus* either in *Linnaea* or in the *Flora Brasiliensis*, I have come to the conclusion that Sir William Hooker was in error in attributing this specimen to Sellow, and that it was probably collected in Panama, possibly by Seemann.

7. ***Calycolpus gracilis*** (Berg) Riley, sp. nov.

Frutex 6–8 pedalis (Kegel). *Ramuli* graciles, teretes, apice tantum quadrangulati vel subalati, rugulosi, fusco-cinerei, ultimis fere sub angulo recto patentibus. *Folia* ovata, ovato-elliptica, vel anguste lanceolata, 5–9.5 cm. longa, 2–4 cm. lata, longissime et acute acuminata, basi cuneata vel acuta, vix revoluta, supra opaca, subtus pallidiora et subnitentia, nervis lateralibus utrinsecus circiter 20, supra satis subtus praecipue manifestis rete venularum utrinque vix visibili; petioli 2–3 mm. longi. *Pedicelli* 9 mm. longi. *Calycis lobi* anguste et acute triangulati, circiter 8 mm. longi, 2.5–3 mm. lati, glabri. *Flos* apertus, in sicco, 2 cm. diametro. *Ovarium* globosum, glabrum.—*C. Kegelianus* var. *gracilis* Berg in *Linnaea*, xxvii. 382; Pulle, *Enum. Pl.*

Surinam, 335. *Psidium aromaticum* Schauer in Linnaea, xxi. 272. non Aubl.

DUTCH GUIANA: in woods near Mariepaston, fl. May, Kegel 1341 (type in Herb. Göttingen.).

I have compared this specimen, which is the type of *C. Kegelianus* var. *gracilis* Berg, with the type of *C. Kegelianus* var. *robustus* Berg, and I have no hesitation in treating it as specifically distinct. The whole facies of the plant is different, and, in detail, I note especially the terete branchlets spreading at right angles, the thinner narrower leaves, acute or cuneate at the base, and the much shorter pedicels.

There is only one flower on the specimen, and, on this account, I have forborne to dissect it.

8. ***Calycolpus angustifolius* Riley, sp. nov.**

Ramuli ascendentes vel subpatentes, teretes vel iuniores subquadrangulati, 3 mm. diametro 15 cm. infra apicem, fusci, glabri, internodiis 2-4.5 cm. longis. *Folia* lanceolata, rarius ovato-lanceolata, 4.5-7 cm. longa, 2-3 cm. lata, acute acuminata, basi subacuta vel acute cuneata, marginibus subrevolutis, glabra, supra fere nigra, nitida, subtus fusca, nitidula, nervis lateralibus utrinsecus ultra 20 subparallelis utrinque satis conspicuis; petioli 2.5-4 mm. longi, glabri. *Flores* in axillis 1-4-fasciculati; pedicelli 2-3 cm. longi, glabri, apice subcompressi vix incrassati; bracteolae 0.75-1 mm. longae, obtuse triangulatae. *Lobi calycis* ovati, 6.5 mm. longi, 4 mm. lati, obtusi, utrinque glabri. *Petala* rotundata, 1.1 cm. longa 1.3 cm. lata, basi truncata, utrinque glabra, minute ciliata. *Filamenta* circiter 6 mm. longa; antherae 1.5 mm. longae. *Ovarium* campanulatum, 4 mm. altum, 4 mm. diametro, glabrum; stylus 9.5 mm. longus, subcapitatus, glaber. *Fructus* subglobosus, 8-9 mm. diametro; semina subreniformia, 3.5 mm. alta, 2.5 mm. diametro, fulva, laevigata, nitida.

BRAZIL: Pará, thick forest S.E. of S. José, fl. and fr. Dec., Burchell 9754 (type in Herb. Kew.).

9. ***C. Goetheanus* (Mart. ex DC.) Berg** in Linnaea, xxvii. 381 (1856), et in Mart. Fl. Bras. xiv. pars 1, 412, tt. 6, f. 129, 43 (1857).—*Myrtus*? *Goetheana* Mart. ex DC. Prodr. iii. 240 (1828). BRAZIL: Rio Negro, Martius; near Barra, fl. and fr. Feb., Spruce 1340, fl. Oct., Spruce 1804, 1840.

In the description in the Prodrômus, De Candolle associates with Martius' specimen a plant collected by Parker near Demerara. Berg does not cite Parker's specimen under *Calycolpus Goetheanus*. In the Kew Herbarium there are three sheets of a *Calycolpus* collected by Parker at Demerara, but these represent a variety of *C. glaber* and certainly cannot be referred to *C. Goetheanus* on account of the quite different venation of the leaves. I have not seen Martius' specimen, but the material of Spruce 1340 and 1804 agrees both with the description in the Prodrômus and with the figure in Mart. Fl. Bras. The material of Spruce 1840 has propor-

tionately broader leaves, and Spruce has written on the label that it "seems distinct from 1804". I cannot, however, find any character of sufficient importance to justify separating it.

According to Spruce's field notes, *C. Goetheanus* is a bush or bushy tree, 6–20 ft. high, with deciduous bark and brown polished stems. The flowers are white and odoriferous, and the fruit green.

The specimen in the Göttingen Herbarium collected by Nolte in Surinam, and referred by Pulle (Enum. Pl. Surinam 335) to *C. Goetheanus*, is *C. glaber* (Benth.) Berg.

10. *Calycolpus cordatus* Riley, sp. nov.

Arbor parva. *Ramuli* subteretes, superne quadrangulati, 2.75 mm. diametro 15 cm. infra apicem, ascendentes, cinerei vel fusci, glabri, internodiis 1.5–3.5 cm. longis. *Folia* ovata, rarius elliptica, 4–8.5 cm. longa, 1.5–4.5 cm. lata, cuneato-acuminata, acuta, basi cordata vel rotundata, rarissime cuneata, marginibus revolutis, supra nigro-brunnea, nitida vel subnitida, subtus pallidiora, subnitida, utrinque glabra, nervis lateralibus utrinsecus 12–18 irregulariter dispositis supra manifestis subtus cum rete venularum et nervo inframarginali conspicuis; petioli 2–3 mm. longi, glabri. *Flores* in axillis 1–3-fasciculati; pedicelli 1.5–2.5 cm. longi, glabri, subcompressi, versus apicem incrassati; bracteolae ovatae, 0.75–1 mm. longae, subacutae, sparse ciliatae. *Lobi calycis* ovati, 5 mm. longi, 3 mm. lati, obtusi vel subrotundati, utrinque glabri, basi intus pilosa excepta. *Petala* alba, obovata, 1.7 cm. longa, 1 cm. lata, integra, glabra. *Filamenta* circiter 8 mm. longa; antherae 1 mm. longae. *Ovarium* cupulatum, 3–4 mm. altum, 3.75–5 mm. diametro, glabrum, 5-loculare; stylus 1.4 cm. longus, oblique capitatus, glaber; ovula oblonga, vix 0.5 mm. longa. *Fructus* subglobosus, 1.8 cm. diametro; semina subreniformia, 3.25 mm. longa, 2.5 mm. lata, lutea, sub lente regulariter et gracillime reticulata.

BRAZIL: Pará; Caripi, fl. Aug., *Spruce* 116 (type in Herb. Kew.); Caripi, fr. Aug., *Spruce* sine numero; Caripi, on the beach, fl. Sept., *Spruce* 144; forest S.E. of S. José, fl. Nov., *Burchell* 9719.

In Burchell's specimen the leaves are mostly narrower and more often obtuse at the base than those of the type; they are also frequently gradually acuminate rather than cuspidate-acuminate.

11. *C. glaber* (Benth.) Berg in Linnaea, xxvii. 379 (1856); Mart. Fl. Bras. xiv. pars 1, 411 (1857); Linnaea, xxx. 708; Pulle, Enum. Pl. Surinam, 335 (1906).—*Campomanesia glabra* Benth. in Hook. Journ. Bot. ii. 319 (1840). *Calycolpus Schomburgkianus* Berg in Linnaea, xxvii. 380; Linnaea, xxx. 708; Ndz. in Engl. Pflanzenfam. iii. Abt. 7, 66, f. 34, G-J. *C. ovalifolius* Berg, l.c. 379; Griseb. Fl. B.W.I. 241. *C. Goetheanus* Pulle, l.c., non Berg. *Calycolpus* sp. Riley in Kew Bull. 1925, 136. *Psidium fluviatile* Miq. in Linnaea, xxii. 169 (1849), non Rich. (fide Berg).

TRINIDAD: Arima, *Crueger* 35; Aripo, *Crueger*; Cumuto road, 30 m., fl. May, *Riley* 97 (Herb. Kew.); Irois, *Crueger* 215, *Trin.*

Herb. no. 2321; between Pitch lake and Guapo Beach, *Trin.* *Herb.* no. 2317; Maraccas, *Trin.* *Herb.* no. 1729; Cedros, Coromandel, *Broadway* 9410; without locality, *Trin.* *Herb.* no. 1302. BRITISH GUIANA: Pomeroon river, *Schomburgk* 866, (1476 R.); Bartica Grove, *Jenman* 2430, 4749; Mazaruni, Appun 389, *Jenman* 628, 660, 715, 740, 5269; Potaro river below the Kaieteur, *Jenman* 1000; Essequibo, *Schomburgk* 2 (type), 5 (237), 289; Pirara, *Schomburgk* 302; Demerara river, *Jenman* 3831, 3922, 4931; Roraima, *Schomburgk* 266; Demerara, *Parker*; without locality, *Drake*. DUTCH GUIANA: *Nolte* (*Herb. Göttingen*). FRENCH GUIANA: *Poiteau*. BRAZIL: Maranhao, in dry woods, fl. June, *Gardner* 6027.

I have not seen *Kappler* 1700 from Dutch Guiana, nor *Poeppig* 2935 from the province of Pará in Brazil, both cited as *C. glaber* by Berg in *Mart. Fl. Bras.*, and have therefore preferred not to cite them myself.

The pedicels in *Gardner's* plant are shorter than is usual in *C. glaber*, the longest measuring 1.3 cm. With this exception the specimen agrees well with the type.

I include under *C. glaber* two of Berg's species, viz.:—*C. ovalifolius* from the West Indies and *C. Schomburgkianus* from British Guiana. I have not had access to the type of the former, but, from Berg's description, I can detect no point of difference from the broader-leaved forms of *C. glaber*. Moreover I have seen no specimens of *Calycolpus* from any of the West Indies with the exception of Trinidad, and all the Trinidad material is referable to *C. glaber*. In the same way I have united *C. Schomburgkianus* with *C. glaber* on account of the number of transitional forms which I have seen. Berg describes the ovary of *C. Schomburgkianus* as 5-locular while Bentham says that the ovary of *C. glaber* is 4-locular. But I dissected an ovary of the type of *C. Schomburgkianus* and found it to be 4-locular, and I think little reliance can be placed on this character.

***C. glaber* var. *angustilobus* Riley, var. nov.**

A typo lobis calycis 5–6 mm. longis, 2–2.75 mm. latis, quamobrem bis longis quam latis vel ultra, plerumque acutis recedit.

BRITISH GUIANA: Demerara, *Parker*.

I have hesitated to describe any forms of *C. glaber* as varieties, for the species is most variable in the shape both of the leaves and of the calyx-lobes, and considerable variation sometimes occurs even on an individual branch. But in the variety described above the proportionately narrow calyx-lobes are peculiar and constant in the three sheets of material in the Kew Herbarium. The group seems quite distinct among the wide range of material of *C. glaber* to which I have had access.

12. ***C. revolutus* (Schauer) Berg** in *Linnaea*, xxvii. 383; *Pulle*, *Enum. Pl. Surinam*, 335 (1906).—*Myrtus revoluta* Schauer in

Linnaea, xxi. 272. *M. calophylla* Miq. Stirp. Sur. 35 (1850), non H.B.K.

DUTCH GUIANA: sandy places near Joden-Savannah, fl. Nov., Kegel 1148 (type in Herb. Göttingen.); sandy savannahs at Pará, Wulfschaegel; Surinam River, Focke 236; near Savanne Kompas, Went 390.

I have seen Kegel's specimen only. Miquel (l.c.) identified Focke's specimen as *Myrtus calophylla* H.B.K., and distinguished a variety " β foliis minoribus", citing *M. revoluta* Schauer as a synonym, together with the reference to Kegel's plant. He gives the length of the leaves in Focke's specimen as 1.5–2.5 inches and the peduncles half as long as the leaves. The leaves in typical *C. revolutus* are 1–1.25 inches long, and the peduncles nearly equal the leaves. Pulle (l.c.) includes all the specimens cited above in *C. revolutus*.

The small roundish leaves distinguish *C. revolutus* from any other species I have seen. The leaves are dull on both surfaces and the venation generally inconspicuous, though the mid-rib is prominent on the under surface. The branchlets are most noticeably ascending and 4-winged. The revolute margins and recurved acumen of the leaves are conspicuous. The ovary and the exterior of the calyx-lobes are slightly hairy.

SPECIES EXCLUDENDA.

C. parviflorus Sagot in Ann. Sci. Nat. sér. 6, xx. 181 (1885).

From the description this should not be included in the genus *Calycolpus* as Sagot himself suspected. It is evidently related to *Eugenia*.

XXII.—CONTRIBUTIONS TO THE FLORA OF SIAM.* ADDITAMENTUM XVIII. W. G. CRAIB.

Ryparosa inconstans Craib [Flacourtiaceae]; a *R. Scortechinii* King foliorum nervis lateralibus numerosioribus recedit.

Arbor 8-metralis (ex Kerr); ramuli iuventute adpresse ferrugineo-pubescentes, mox glabri. *Folia* oblongo-oblancoolata vel oblongo-elliptica, apice acuminata, summo apice mucronata, basi cuneata vel cuneato-rotundata, 37–70 cm. longa, 13.5–17 cm. lata, chartaceo-coriacea, glabra, subtus pallidiora, nervis lateralibus utrinque 10–12 arcuatis superioribus intra marginem conspicue anastomosantibus supra conspicuis vel prominulis, subtus prominentibus, nervulis rete pagina superiore conspicuum vel prominulum inferiore prominulum vel prominentem efficientibus, petiolo ad 7.5 cm. longo apice ad 15 mm. valde incrassato supra basi plano suffulta. *Racemi* ♀ e caule orti, ad 40 cm. longi (pedunculo communi brevi incluso), rhachi breviter adpresse ferrugineo-pubescente, pedicellis brevibus. *Calycis* segmenta deltoidea, obtusa, 3.5 mm. longa,

* Continued from *Kew Bull.* 1925, p. 423.

3 mm. lata, dorso ferrugineo-puberula. *Petala* oblonga, 3.5 mm. longa, fere 2 mm. lata, dorso basi excepta adpresse ferrugineo-pubescentia, intra sparse pilosa, basi squamula dense hirsuta 2 mm. longa instructa. *Ovarium* subglobosum, basi angustatum, dense ferrugineo-hirsutum; stigmata 2 vel interdum 3, subsessilia. *Fructus* saepissime 2-lobatus, apice retusus, ambitu oblongus, 2 cm. longus, ad 3 cm. latus, vel rarius 3-lobatus, apice concavus, ad 3 cm. diametro, fusco-brunneus, plus minusve verrucosus, glabrescens.

Pattani, Bachaw, 500 m., evergreen forest; fruit from trunk to about 2 m. above ground, *Kerr* 7179.

Erythroxylum oblanceolatum *Craib* [Erythroxylaceae]; ab affini *E. Wallichii* O. Sch. foliis longioribus recedit.

Frutex circa 1.5 m. altus (ex *Kerr*), glaber; ramuli iuventute compressi, brunnei vel pallide brunnei, mox teretes, brunneo-vel pallide brunneo-corticati. *Folia* oblanceolata, apice obtusa vel acuta, interdum acuminata, costa excurrente apiculata, basi cuneata, 6–12 cm. longa, 1.8–3.4 cm. lata, sat rigida, supra micantia, subtus pallidiora, opaca, nervis lateralibus utrinque circa 12 intra marginem anastomosantibus pagina utraque subconspicuis, costa supra conspicua vix impressa subtus prominente, margine recurva, petiolo 4–8 mm. longo supra canaliculato suffulta; stipulae 6 mm. longae, dorso bicarinatae, apice setula brevi fugace instructae, cito deciduae. *Flores* axillares, pedicello 4–5 mm. longo suffulti. *Sepala* oblongo-ovata, acuta, 1.75 mm. longa, 1 mm. lata. *Petala* oblonga, fere 3.5 mm. longa, 1.5 mm. lata, dorso medio conspicue carinata, ungui 1 mm. longo, lamina vix 2.5 mm. longa, ligula 1 mm. alta. *Urceolus* stamineus calycem subaequans vel eo paulo altior, circa 1.5 mm. altus, apice denticulatus; filamenta circa 2.25 mm. longa, antheris circa 0.6 mm. longis. *Ovarium* glabrum, 1.25 mm. altum; styli (floris brevistyli) ad 0.75 mm. connati, parte libera 0.6 mm. longa.

Surin, Sangka, 300 m., open evergreen forest, *Kerr* 8310.

Hiptage bullata *Craib* [Malpighiaceae-Hireae]; ab affini *H. candicante* Hook. f. habitu et calycis glandulis haud solitariis distinguenda.

Frutex volubilis; ramuli primo dense fulvo-tomentosi, mox pallide tomentelli, demum glabri, brunneo-corticati. *Folia* oblongo-ovata, ovata, vel oblonga, apice breviter obtuse acuminata, basi rotundata, interdum cordata, 7–14.5 cm. longa, 3–7.7 cm. lata, chartacco-coriacea vel coriacea, supra primo fulvo-tomentosa, matura glabra vel hic et illic puberula, subtus densius albo-tomentella, costa subtus prominente, nervis lateralibus utrinque circa 6 supra conspicuis subtus prominentibus intra marginem anastomosantibus, nervulis supra conspicuis vel subprominulis subtus prominulis, lamina basi biglandulosa, glandulis saepe in petiolum decurrentibus, petiolo 7–10 mm. longo supra canaliculato indu-

mento ei ramulorum simili tecto suffulta. *Racemi* et in axillis foliorum delapsorum et ramulos breves terminantes, ad 15 cm. (pedunculo communi circa 2.5 cm. longo incluso) longi, rhachi pedicellisque indumento ei ramulorum simili obtectis, bracteis bracteolisque deciduis; pedicelli 8-10 mm. longi, paulo infra medium articulati. *Sepala* oblonga vel rotundato-oblonga, apice rotundata, circa 2 mm. longa et 1.5 mm. lata, dorso densius adpresse hirsuta, intra basi parce pilosa, glandulis parvis saepissime alternantia. *Filamenta* glabra. *Ovarium* hirsutum, stylo glabro.

Mê Ping Rapids, Kèng Ap Nang, 180 m., Kerr 2945 (*type*). Raheng, Hui Haht Yuak, 450 m., Winit 117.

The flowers are recorded as white with a yellow patch at the base of the lower petals.

Hiptage condita Craib [Malpighiaceae-Hireae]; ab affini *H. lucida* Pierre pedicellis supra medium articulatis, sepalis plus minusve rotundatis dorso ferrugineo-pubescentibus recedit.

Ramuli iuventute fusi, pilis paucis ferrugineis adpressis praesertim ad nodos instructi, cito glabri, cortice plus minusve cinereo prominenter lenticellato obtecti. *Folia* oblongo-lanceolata vel oblonga, apice obtuse acuminata, interdum rotundata, basi cuneata vel rotundato-cuneata, 4.5-8.5 cm. longa, 2.5-3.5 cm. lata, coriacea, pagina utraque glabra vel inferiore inferne saepe pilis paucis ferrugineis adpressis medifixis instructa, nervis lateralibus utrinque 4-7 intra marginem anastomosantibus supra conspicuis vel subconspicuis subtus cum nervis transversis prominulis, margine integra, cartilaginea, petiolo 5-8 mm. longo glabro supra canaliculato suffulta. *Racemi* circa 8 cm. longi, pedunculo communi 1-2 cm. longo suffulti, solitarii, terminales vel saepissime paniculam foliaceam terminalem ad 15 cm. longam formantes, rhachi sparse adpresse ferrugineo-pubescente; pedicelli 12 mm. longi, basi bractea vix 2 mm. longa et ad medium infra articulationem bracteolis duabus circa 1.5 mm. longis instructi, supra medium articulati, sparse breviter ferrugineo-pubescentes, primo recti, obliqui, sub anthesin ad articulationem genuflexi. *Sepala* rotundata vel late ovata, apice rotundata, ad 3 mm. diametro, sat crassa, dorso sparse adpresse ferrugineo-pilosula, intra glabra, margine recurva, ciliolata, glandulis calycinis haud conspicuis 1-2 parvis tantum. *Petala* alba (ex Garrett), orbicularia vel obovata, 10-11 mm. longa, 9-10 mm. lata, fimbriata, stipite 2 mm. longo suffulta, dorso medio sparse adpresse ferrugineo-pubescentia. *Stamina* 10, antheris 1.5 mm. longis, filamento unico 9 mm. longo, aliis 5 mm. longis, omnibus glabris inferne incrassatis parum complanatis basi inter se brevissime connatis. *Ovarium* 3-lobatum, lobis processibus tribus complanatis sparse pubescentibus instructis; stylus unicus 1 cm. longus, glaber, duobus aliis vix evolutis haud 1 mm. longis. *Fructus* 3-alatus, pilis brevibus adpressis ferrugineis medifixis sparsis instructus, ala maiore oblongo-oblancheolata 2 cm. longa 8 mm. lata, duabus minoribus 12 mm. longis 7 mm. latis, styli basi persistente aliformi coronatus.

Chiengrai, Mé Kok, Doi Tam Tu Pu, 530 m., precipitous limestone peak, *Garrett* 154.

Hiptage detergens *Craib* [Malpighiaceae-Hireae]; ab affini *H. sericea* Hook. f. glandula calycina plus minusve circulari haud elliptica et in pedicellum haud conspicue decurrente recedit.

Ramuli iuventute adpresse hirsuti, cito parum glabrescentes, lenticellis parvis rotundatis vix conspicuis, cortice brunneo obtecti. *Folia* oblongo-elliptica vel oblongo-lanceolata, apice acute acuminata, basi rotundata vel late cuneata, 3-5 cm. longa, 1.5-2 cm. lata, coriacea, iuventute pagina utraque dense adpresse pubescentia, cito glabrescentia, matura glabra vel subtus ad costam adpresse pubescentia, saepe ad basem vel prope basem biglandulosa, supra lucida, subtus pallidiora, costa supra subprominula subtus prominente, nervis lateralibus utrinque circa 8 rectis vel subrectis bene intra marginem anastomosantibus supra obscuris subtus subprominulis, margine integra, petiolo ad 5 mm. longo indumento ei ramulorum simili tecto suffulta. *Racemi* foliis breviores, et axillares et terminales; pedicelli 7 mm. longi, paulo infra medium articulati et bracteolis duabus angustis 1.5 mm. longis instructi, indumento ei ramulorum simili tecti, basi bractea bracteolis simili decidua instructi. *Sepala* oblonga, apice rotundata vel obtusa, 2.5 mm. longa, 1.5 mm. lata, dorso adpresse pubescentia, ciliata; glandula calycina solitaria, 2 mm. diametro, haud vel vix decurrens. *Petala* manca, orbicularia vel deltoideo-ovata, basi cordata, 6-7 mm. longa, 6 mm. lata, dorso pubescentia, margine denticulata vix fimbriata, longius ciliata, ungui ad 2 mm. longo pubescente suffulta. *Filamenta* glabra, longiora circa 7 mm. longa. *Ovarium* pubescens, stylo glabro.

Pang-nga, Pulau Panji, *Haniff and Nur* 4007.

Brachylophon anastomosans *Craib* [Malpighiaceae-Banisterieae]; a *B. Scortechinii* King foliorum nervis lateralibus paucioribus crassioribus bene intra marginem anastomosantibus, a *B. Curtisii* Oliver foliis tenuioribus, ab ambobus rhachi graciliore glabro, pedicellis brevioribus recedit.

Suffrutex ad 1 m. altus (ex *Kerr*); ramuli graciles, angulati, internodiis glabri vel hic et illic minute puberuli, ad nodos conspicue cinnamomeo-barbati, cinnamomei, lenticellis inconspicuis. *Folia* opposita, inaequilateralia, latere altero dimidiatim oblongo-elliptica, altero dimidiatim oblanceolata, apice acuminata vel caudato-acuminata, acuta, basi latere altero latius cuneata, altero acuminata, 11-15 cm. longa, 4-5 cm. lata, membranacea vel chartaceo-membranacea, supra viridia, subtus pallidiora, glabra, nervis lateralibus utrinque 7-9 rectis bene intra marginem anastomosantibus supra gracilibus subprominulis subtus prominentibus, nervulis paucis subtus prominentibus vel prominulis, margine anguste recurva, petiolo ad 7 mm. longo supra canaliculato suffulta. *Racemi* axillares, ad 11 cm. longi (pedunculo communi ad 2 cm. longo incluso), nodosi, angulati, glabri; pedicelli circa 4 mm.

longi, basi parvi-bracteati. *Sepala* 5, imbricata, oblongo-elliptica, obtusa, 2.5 mm. longa, 1.5 mm. lata, ciliolata. *Petala* oblonga, apice rotundata, basi truncata, stipite brevi instructa, 11 mm. longa, 5 mm. lata. *Antherae* 4 mm. longae; filamenta inaequalia, 5 recta, 2 mm. longa, 5 ad medium refracta, parte dimidia superiore horizontaliter radiante, circa 4 mm. longa. *Ovarium* 1.25 mm. altum, glabrum, 3-lobatum, 3-loculare, ovulis solitariis pendulis; styli 3, graciles, pallidi, circa 7.5 mm. longi, e basi liberi, divergentes. *Fructus* glaber, viridis, reticulatus, stylorum basibus persistentibus induratis apiculatus, ad 1 cm. longus.

Pattani, Banang Sta, 50 m., forming great part of undergrowth in evergreen forest on limestone, *Kerr* 7306.

Connaropsis varians *Craib* [Oxalidaceae]; a *C. glabra* Ridl. foliis maioribus haud semper simplicibus, pedicellis longioribus recedit.

Ramuli graciles, iuventute ferrugineo-tomentelli, angulati, mox crasse puberuli, demum glabri et teretes, cortice brunneo vel cinereo-brunneo obtecti, lenticellis haud conspicuis. *Folia* saepissime simplicia, interdum more trifoliatim pinnata sed foliolo laterali altero haud evoluto altero terminali simili sed conspicue minore, ovato-oblonga vel ovato-lanceolata, apice obtuse acuminata, basi rotundata, 7-14 cm. longa, 3-6.5 cm. lata, rigide chartacea, glabra, pagina superiore sicco fusco-brunnea, inferiore brunnea, nervis lateralibus utrinque 5-8 bene intra marginem anastomosantibus supra subprominulis subtus cum costa prominentibus, nervulis supra conspicuis interdum subprominulis subtus rete prominulum efficientibus, margine integra, anguste cartilaginea, petiolo usque ad 15 mm. longo ad medium articulo suffulta. *Inflorescentiae* binae, axillares, racemiformes, usque ad 4 cm. longae, breviter pedunculatae; rhachis sparse pubescens; bractae parvae, ferrugineo-pubescentes; pedicelli 3-4 mm. longi, sub anthesin graciles, apicem versus incrassati, subglabri, cito conspicue incrassati. *Sepala* 5, imbricata, exteriora 2 mm. longa, 2.75 mm. lata, interiora paulo angustiora et longiora, omnia ciliolata et dorso parce glanduloso-puberula. *Petala* 5, linearia, 5.5 mm. longa, 0.6 mm. lata. *Filamenta* vix 3 mm. longa, antheris parvis. *Pistillum* 2.5 mm. altum, stylis 5.

Pattani, Betong, 400 m., high evergreen forest, *Kerr* 7680.

Geranium siamense *Craib* [Geraniaceae]; ab affini *G. nepalense* Sweet pedicellis saepissime multo longioribus pilis adpressis haud patulis instructis, sepalis oblongis longius mucronatis 5-nerviis recedit.

Caules ad 40 cm. longi, subgraciles, sicco plus minusve brunnescentes, primo pilis deflexis albis sat rigidis densius tecti, mox plus minusve glabrescentes, basi glabri, ad medium vel ultra medium defoliati. *Folia* basalia ambitu 5-angulata vel reniformia, ad 4 cm. diametro, ultra medium sed haud ad basem 5-lobata, lobis obovato-rhomboideis ad 2 cm. longis vix 2 cm. latis supra

medium utrinque 2-3-lobulatis, lobulis mucronatis, chartacea, supra viridia, pilis albis sat rigidis conspicuis sed subsparsis tecta, subtus plus minusve rubra, rarius pallide viridia, pilis albis sat rigidis divergentibus ad nervos nervulosque instructa, nervis nervulisque supra impressis subtus prominentibus, petiolo ad 20 cm. longo suffulta, caulinia opposita, rarius alterna, basalibus similia sed parum minora, petiolo ad 1.5 cm. longo vel rarius usque ad 8 cm. longo, suprema petiolo 2-3 mm. longo suffulta; stipulae inter se fere omnino liberae, omnino connatae, vel in unam apice plus minusve lobatam connatae, ad 5 mm. longae, dorso parce pubescentes, cito glabrescentes, ciliatae. *Pedunculi* 5-9 cm. longi, biflori, indumento ei caulium simili tecti, pedicellis 2.5-4 cm. longis similiter sed densius tectis; bracteae stipulis similes; flores rosei (ex *Kerr*). *Sepala* oblonga, apice parum retusa et mucrone 1.75 mm. longo instructa, mucrone excluso 1 cm. longa, 3.75 mm. lata, 5-nervia, intra glabra, extra ad costam setis instructa, aliter breviter adpresse pubescentia, margine latius membranacea, ciliata. *Petala* obovata, apice retusa, basi angustata, 17 mm. longa, 11.5 mm. lata, basi intra parce pubescentia, inferne ciliata. *Filamenta* 8-9 mm. longa, basi oblongo-elliptica, parte lineari inferne pubescentia, parte basali dorso adpresse pubescentia, intra glabra vel interiora pilis paucis elongatis ima basi medio instructa. *Carpella* 1 mm. alta, pilis longis albis oblecta; styli 8 mm. longi, parte dimidia superiore glabri, inferiore pilis divergentibus albis rigidis distantibus instructi.

Doi Chiengdao, 2100 m., abundant on open rocky ground, *Kerr* 6601.

***Impatiens calcicola* Craib** [Balsaminaceae]; species nova *I. verruciferae* Hook. f. similis sed herbacea, caule haud verrucoso, sepalis maioribus asymmetricis, alarum lobo distali bilobato differt.

Caulis erectus, 15-60 cm. altus, aquosus, inferne usque ad medium nudus, basi circa 1.5 cm. diametro, purpureo-suffusus vel plus minusve maculatus, simplex vel supra medium ramosus, iuventute puberulus, cito glaber. *Folia* alterna, rarissime subopposita, oblongo-ovata vel oblongo-obovata, apice breviter acuminata, mucronulata, basi attenuata vel cordatula, haud rarius inaequilateralis, ad 16 cm. longa et 8.5 cm. lata, sat crassa, pagina utraque plus minusve breviter puberula, superiore glabrescentia, viridia, inferiore pallidius viridia, nervis lateralibus utrinque 12-16 supra parum impressis subtus prominentibus, nervulis vix conspicuis, margine parte basali excepta crenata, crenis apiculatis, limbo ima basi vel ad 2 cm. supra basem glandula viridi subtus utrinque instructo, petiolo 0.5-7.5 cm. longo primo breviter puberulo supra plano suffulta; glandulae infrapetiolares deficientes. *Pedicelli* axillares, solitarii vel gemini, vix 2.5 cm. longi, densius puberuli, basi parvi-bracteati, pedunculo communi vix evoluto. *Sepala* 5; duo antica membranacea, oblonga vel lanceolata, 1.5-5 mm. longa, 0.75-2 mm. lata, latere antico fere ad medium longius

cornuta, in exemplo uno ad 1 cm. longa et 0.5 cm. lata, cornu deficiente; duo lateralia viridi-alba, apice viridia, valde inaequalateralia, latere altero dimidiatim elliptico-oblonga, altero dimidiatim cuneata, apiculo 2.5 mm. longo instructa, 1.8-2 cm. longa, 1.5 cm. lata, extra puberula, intra glabra; posticum (labellum) limbo cymbiformi vel saccatim infundibulari apiculato 1.5 cm. longo, ore recto late elliptico circa 1.5 cm. diametro, extra pallido intra praesertim antice aurantiaco-maculato, calcare crasso 4-5 mm. longo alte bifido, segmentis apice rotundatis breviter obtuse apiculatis, pallido. *Vexillum* pallidum, oblongum vel oblongo-obovatum, apice emarginatum, ad 1.7 cm. longum et 1.2 cm. latum, costa dorso medio inferne carina fere 8 mm. longa et 4 mm. alta rotundata margine viridi instructum et paulo infra apicem cuspidatum; alae inter se connatae, stipite incluso 3-3.5 cm. longae, 1.5 cm. latae, intra medio basi carinatae, lobo basali subquadrato 0.8-1 cm. longo 1-1.6 cm. lato, distali ad 2 cm. longo et 1.2 cm. lato apice altius inaequaliter bilobato, lobulo altero lineari altero deltoideo, lilacinae, intra basi medio et lateribus aurantiacae et rubro-maculatae. *Filamenta* 6 mm. longa, antheris connatis pallidis verruculosus. *Ovarium* viride, circa 7 mm. longum, glabrum, longitudinaliter costatum.

Ratburi, 50-200 m., crevices of limestone rocks, Kerr 8991 (type), Marcan 1761.

The description has been drawn up from plants raised at Aberdeen from seed forwarded by Dr. A. F. G. Kerr. The plants flowered from July to November, 1925.

***Impatiens Garrettii* Craib** [Balsaminaceae]; inter species pedunculo communi evoluto racemis e floribus 2-3 tantum compositis, calcare elongato gracili integro, alarum lobo basali parvo distincta.

Herba annua; caulis simplex vel parce ramosus, circa 20 cm. altus, glaber vel apicem versus breviter parce pilosus. *Folia* inferiora saepissime opposita, superiora alterna, lanceolata, ovato-lanceolata, vel subovata, apice subacuminata, acuta, basi cuneata vel rotundata, ad 7.5 cm. longa et 3 cm. lata, membranacea, sicco subtus pallidiora, supra pilis brevibus crassis hic et illic instructa, subtus iuventute ad costam nervosque laterales parce breviter pilosa, mox glabra, nervis lateralibus utrinque circa 10 supra vix conspicuis subtus subprominulis, margine anguste crenata, crenis apiculatis, petiolo 4-18 mm. longo supra canaliculato et saepissime densius pilosulo aliter glabro rarius omnino glabro suffulta; glandulae infrapetiolares deficientes. *Racemi* axillares, 2-3-flori, pedunculo communi ad 2.5 cm. longo suffulti, pedicellis circa 7 mm. longis; bractae parvae, sub anthesin persistentes. *Sepala* lateralia late ovata, apiculata, 5 mm. longa, 3.75 mm. lata; posticum (labellum) limbo 1 cm. longo ore breviter apiculato 1.3 cm. diametro, calcare gracili 3 cm. longo apice integro. *Vexillum* ovatum, 6 mm. longum, 5 mm. latum, dorso medio subalatum et

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paulo infra apicem cornutum; alae inter se liberae, 2.2 cm. longae, lobo basali parvo vix 6 mm. longo, distali dimidiatim late elliptico 1 cm. lato. *Filamenta* 5 mm. longa.

Doi Angka, 1300-1675 m., *Garrett* 94.

***Impatiens Kerriae* Craib** [Balsaminaceae]; caule crasso, foliis alternis *I. Parishii* Hook. f. similis, pedicellis multo longioribus distinguenda.

Herba perennis; caules ad 1 m. alti, saepissime ramosi, glabri, iuventute virides, crassi, basi tumidi, ad 4-5.5 cm. diametro, cinereo-brunnei. *Folia* alterna, lanceolata, oblongo-lanceolata, vel ovato-lanceolata, apice breviter subacuminata, costa excurrente mucronata, basi cuneata vel saepe inaequilateralia, latere altero cuneata vel rotundato-cuneata, altero cuneata vel acuminata, usque ad 13 cm. longa et 6.5 cm. lata, subcrassa, supra intense viridia, iuventute nitentia, subtus pallide viridia, glabra, nervis lateralibus utrinque circa 12 supra impressis subtus prominentibus superioribus arcuatis inferioribus arcuatis vel saepe obliquis, margine arcte anguste crenulata, crenis incurvo-apiculatis, lamina ina basi glandula solitaria columnari primo erecta mox patula utrinque instructa, petiolo ad 6 cm. longo apice lamina decurrente subalato glabro suffulta; glandulae infrapetiolares deficientes. *Pedicelli* axillares, solitarii vel saepissime tres, 7 cm. longi, patuli, glabri, virides, superne incrassati. *Sepala* 3; duo lateralialia subelliptica vel rotundato-elliptica, acumine viridi fere 4 mm. longo incluso 2 cm. longa, 1.5 cm. lata, glabra, viridi-alba, costa prominente parum obliqua; posticum (labellum) cymbiforme, 1.3 cm. longum, ore oblongo-elliptico apice breviter viridi-cuspidato ad 2.2 cm. diametro, pallidum, basi rubro-venosum, calcare 5 mm. longo pallide viridi bilobato, lobis apice pallidis rotundatis saepe summo apice acuminatis, limbo adpresso. *Vexillum* elliptico-obovatum, apice emarginatum, 2.2 cm. longum, 2 cm. latum, glabrum, dorso infra apicem breviter cuspidatum et medio inferne obtuse carinatum, album vel inferne viridi-suffusum; alae inter se connatae, ad 3.8 cm. longae et latae, apice bifidae, lobo basali apice rotundato, distali 1.5 cm. longo 0.8 cm. lato apice rotundato, intra medio rubro-venosae, plus minusve lutcae, margines versus pallescentes. *Filamenta* 8 mm. longa, glabra, antheris 4.5 mm. longis puberulis. *Ovarium* 9 mm. longum, viride, glabrum.

Doi Chiengdao, 1800 m., limestone rocks, *Kerr* 6544.

Plants grown from seed collected by Dr. Kerr in above locality were used for the description. The plants flowered in Aberdeen in October, 1924 and 1925.

Named in memory of Mrs. Kerr, who died in N. Siam.

***Impatiens longiloba* Craib** [Balsaminaceae]; ab *I. bracteolata* Hook. f. bracteis latioribus cito deciduis, sepalis latioribus inter alia differt.

Herba ad 1 m. alta (ex *Kerr*); caulis herbaceus, stramineus, glaber vel superne glandulis paucis stipitatis instructus. *Folia*

alterna, lanceolata, ovata, vel late ovata, apice acuminata, mucronulata, basi cuneata vel acuminata, 3.5–11 cm. longa, 2–5 cm. lata, membranacea, glabra, subtus parum pallidiora, nervis lateralibus utrinque 10–12 intra marginem anastomosantibus pagina superiore conspicuis inferiore prominulis, nervis transversis supra interdum subconspicuis subtus subprominulis, margine basi excepta crenata, crenis apiculatis, inferne sparse glandulosociliata, petiolo 0.3–3 cm. longo glandulis stipitatis paucis instructo suffulta; glandulae infrapetiolares saepissime binae. *Racemi* ex axillis foliorum superiorum orti, pauciflori, pedunculo communi 3–5 cm. longo suffulti, glabri; pedicelli graciles, 10–12 mm. longi; bractee membranaceae, ovatae, mucronatae, circa 6 mm. longae, alabastra obtegentes, cito deciduae. *Sepala* 5; duo antica linearia, 5 mm. longa, 0.6 mm. lata; duo lateralia late oblique ovata, mucronata, 5.5 mm. longa, 4 mm. lata; posticum (labellum) calcare incluso 3.3 cm. longum, ore apiculato 8 mm. diametro, glabrum. *Vexillum* 1 cm. longum, paulo ultra 1 cm. latum, dorso medio carinatum; alae inter se liberae, circa 3 cm. longae, lobo basali oblongo apice rotundato 5 mm. longo 4.5 mm. lato, distali lineari 20 mm. longo 4 mm. lato. *Ovarium* glabrum. *Semina* pilis spiralibus tecta.

Doi Angka, 1800–2125 m., *Garrett 72 (type)*, *Kerr 6298*.

Impatiens muscicola *Craib* [Balsaminaceae]; herba nana, erecta, foliis alternis, floribus axillaribus parvis ecalcaratis distincta.

Herba pusilla, caule erecto ad 11 cm. alto simplice vel saepissime pauci-ramoso glabro sicco rubescente. *Folia* alterna, lanceolato-ovata, rarius subovata, apice costa excurrente apiculata, basi cuneata vel rotundato-cuneata, 7–15 mm. longa, 3.5–7 mm. lata, membranacea, supra pilis paucis instructa, subtus pallidiora, glabra, nervis lateralibus utrinque 3–4 supra fere obscuris subtus subconspicuis, margine pauci-denticulata, ciliata, basi eglandulosa, petiolo 1–3 mm. longo suffulta. *Flores* axillares, solitarii, pedicellis gracilibus circa 6 mm. longis unilateraliter breviter pilosis suffulti; alabastra pilis paucis sat longis transverse septatis instructa. *Sepala* lateralia angusta, vix 0.75 mm. longa, parce pilosa, postico vexillo simili ecalcarato. *Vexillum* oblongo-ellipticum, acute acuminatum, 2.25 mm. longum, 1.5 mm. latum, dorso pauci-pilosum; alae 2.5 mm. longae, 1.5 mm. latae, lobo basali oblongo-rotundato 0.75 mm. longo. *Filamenta* 1.5 mm. longa, gracilia. *Capsula* vix matura fusiformis, acuminata, breviter sparse pilosa.

Doi Chiengdao, 2100 m., on mossy rocks, flowers pale pink, *Kerr 6608*.

Impatiens Noei *Craib* [Balsaminaceae]; ab *I. Aureliana* Hook. f. vexillo pro rata longiore, alarum lobis distalibus basalibus maioribus, seminibus haud glabris recedit.

Herba annua; caules erecti, 20–30 cm. alti, graciles, simplices

vel saepissime ramosi, iuventute parce breviter ferrugineo-hirsuto-pubescentes, cito plus minusve glabrescentes, demum glabri. *Folia* alterna, lanceolata, apice acuta, saepe subacuminata, basi cuneata vel longius acuminato-attenuata, ad 4.5 cm. longa et 1.5 cm. lata, chartacea vel membranaceo-chartacea, pagina superiore viridia, inferiore pallidiora, utraque breviter pubescentia, nervis lateralibus utrinque circa 8 subtus conspicuis supra obscuris vel subconspicuis, nervulis obscuris vel paucis subtus subconspicuis, margine distanter denticulata, inferne saepissime glandulis stipitatis paucis utrinque instructa, petiolo ad 2 cm. longo primo parce breviter pubescente suffulta; glandulae infrapetiolares haud evolutae. *Flores* axillares, gemini, pedicellis gracilibus 1.8–2 cm. longis basi parvibracteatis suffulti; alabastra sparse pubescentia. *Sepala* 3; duo lateralia lineari-lanceolata, acuta, 2 mm. longa; posticum (labellum) limbo 3 mm. longo apice ad 5 mm. diametro breviter apiculato, calcare curvato 1.3 cm. longo integro, sparse pubescens. *Vexillum* obovatum, apice retusum, mucronatum, 5.5 mm. longum, 4.5 mm. latum, dorso breviter sparse pubescens et medio longitudinaliter carinatum; alae inter se liberae, 8 mm. longae, lobo basali oblongo apice rotundato 4 mm. longo 1.75 mm. lato, distali 5 mm. longo medio 3 mm. lato. *Filamenta* 2.5 mm. longa. *Ovarium* 2 mm. longum, adpresse pubescens. *Capsula* fusiformis, 1 cm. longa, pilis pallide ferrugineis crassiusculis tecta, seminibus pilis spiralibus tectis.

Saraburi, Muak Lek, Kao Mak Kok, Noe 128.

***Impatiens opinata* Craib** [Balsaminaceae]; ab affini *I. mirabili* Hook. f. floribus minoribus inter alia differt.

Caulis carnosus, basi tuberosus, 10–25 cm. altus, sicco substramineus. *Folia* alterna, ad caulis apicem aggregata, elliptica vel ovato-elliptica, apice breviter acuminata, mucronata, basi acuminata, 6–16.5 cm. longa, 4.5–10 cm. lata, membranacea, sicco plus minusve fusciscentia, glabra, nervis lateralibus utrinque 4–7 intra marginem prorsus curvatis pagina utraque conspicuis vel subconspicuis, margine distanter serrulata, petiolo 4–7.5 cm. longo glabro suffulta; glandulae infrapetiolares deficientes. *Racemi* solitarii, terminales, folia superantes, pedunculo communi 8–13 cm. longo infra flores bracteas duas foliaceas parvas gerente suffulti; flores lutei (ex *Kerr*); bracteae sub anthesin persistentes, circa 3.5 mm. longae; pedicelli 7 mm. longi, glabri. *Sepala* 5; duo antica linearia, acuta, 7 mm. longa, 1.3 mm. lata; duo lateralia oblique oblongo-elliptica, apiculata, 8 mm. longa, 5 mm. lata; posticum (labellum) limbo 1.3 cm. longo ore apiculato 1.2 cm. diametro, calcare apice integro obtuso 1.3 cm. longo. *Vexillum* transverse ellipticum, 7 mm. longum, 7.75 mm. latum, dorso medio tantum carinatum; alae inter se connatae, vix 2 cm. longae, inferne 2.4 cm. latae, lobo basali rotundato, distali anguste oblongo 10 mm. longo 4.5 mm. lato. *Ovarium* glabrum.

Pattani, Banang Sta, 50–300 m., crevices of limestone rocks, evergreen forest, *Kerr* 7304.

Impatiens patula Craib [Balsaminaceae]; ab affini *I. violiflora* Hook. f. calcare longiore, alarum lobis et basalibus et distalibus longioribus angustioribus recedit.

Herba annua; caulis erectus, ad 38 cm. altus, inferne nudus, simplex vel saepissime medio parce breviter ramosus, primo parce pilosus, mox glaber, sicco brunnescens. *Folia* inferiora decidua, superiora alterna, lanceolata vel lineari-lanceolata, apice costa excurrente mucronata, basi attenuato-cuneata, 3.5-7 cm. longa, 0.8-1.3 cm. lata, chartacea, pagina superiore pilis subcrassis transverse septatis sparsis inferiore pilis brevioribus ad costam nervosque laterales instructa, subtus pallidiora, nervis lateralibus utrinque 6-8 pagina superiore vix conspicuis inferiore conspicuis, nervulis pagina utraque obscuris vel inferiore paucis subconspicuis, margine distanter denticulata, petiolo 0.5-2 cm. longo primo parce piloso mox glabro suffulta; glandulae infrapetiolares deficientes. *Pedicelli* axillares, graciles, ad 3 cm. longi, parce pilosi; flores violacei (ex Kerr). *Sepala* 3; duo lateralia lineari-subulata, 3 mm. longa; posticum (labellum) limbo 5 mm. longo ore ad 7 mm. diametro apiculato parce pubescente, calcare gracili 3.2 cm. longo glabro integro. *Vexillum* subquadratum, apice emarginatum, 12 mm. longum, 13 mm. latum, glabrum, dorso infra apicem cornutum, haud medio carinatum; alae inter se liberae, 18.5 mm. longae, lobo basali patulo anguste oblongo 11 mm. longo 4.5 mm. lato apice retuso, distali 14 mm. longo medio 8 mm. lato supra medium brevius angustato parte triente apicali lineari. *Ovarium* 3.5 mm. longum, breviter pubescens.

Kampèngpet, Kao Hua Mot, 800 m., open grassy forest, Kerr 6128.

Impatiens saxicola Craib [Balsaminaceae]; herba nana, foliis parvis, floribus axillaribus solitariis parvis vix calcaratis cognoscenda.

Caules circa 20 cm. alti, nodis inferioribus radicales, straminei, glabri vel iuventute pilis paucis brevibus instructi, inferne ramosi. *Folia* alterna, lanceolata, apice acuminata vel subacuminata, costa excurrente apiculata, basi cuneata vel acuminato-cuneata, ad 3.5 cm. longa et 1.1 cm. lata, membranacea, supra pilis paucis instructa, subtus glabra, nervis lateralibus utrinque circa 6 obscuris, margine crenata vel serrulato-crenata crenis apiculatis, basi utrinque pauciciliata, petiolo 3-10 mm. longo suffulta. *Flores* axillares, solitarii, pedicellis gracilibus circa 1.5 cm. longis basi bracteatis suffulti. *Sepala* 3, oblongo-lanceolata, acuta, 2 mm. longa et 0.8 mm. lata, postico basi saccato vix calcarato. *Vexillum* rotundato-oblatum, acute acuminatum, 3.5 mm. longum, 4 mm. latum, medio incrassatum, aliter membranaceum, dorso obtuse carinatum; alae 7.5 mm. longae, lobo basali 2.5 mm. longo 2 mm. lato, distali obtuso supra medium 2 mm. latum angustato. *Filamenta* ad 2.5 mm. longa, inferne gracilia, superne ampliata. *Ovarium* sulcatum, circa 2 mm. altum, parce setulosum.

Kaw Chang, Lêm Dan Kao, 400 m., on open rocks, flowers pale mauve, with yellow spots at base of lip, *Kerr* 9303.

Impatiens subaequalis *Craib* [Balsaminaceae]; ab *I. violiflora* Hook. f. alarum lobis basalibus pro rata maioribus, ab *I. Aureliana* Hook. f. sepalis maioribus, vexillo aequilongo et lato, ab ambabus floribus multo minoribus recedit.

Herba annua; caulis inferne radicans, 20–30 cm. altus, parte dimidia superiore saepissime simplice, inferiore ramosa, ramulis infimis oppositis, glaber, sicco stramineus. *Folia* inferiora opposita, superiora alterna, lanceolata vel ovata, apice acuminata, mucronulata, basi cuneata vel late cuneata, 3–8 cm. longa, 1.7–2.5 cm. lata, membranacea, supra pilis albis transverse septatis sparse instructa, sicco viridia, subtus ad costam nervosque laterales pilis paucis brevibus instructa, parum pallidiora, nervis lateralibus utrinque 8–10 supra subconspicuis subtus prominulis, nervis transversis paucis subtus conspicuis, margine distanter serrulata, petiolo ad 6 mm. longo parce pubescente suffulta; glandulae infrapetiolares saepissime evolutae, paucae, parvae. *Pedicelli* axillares, sub anthesin 1.5 cm. longi, infructescentes 2 cm. longi, pilis paucis adpressis instructi; flores punicei (ex *Kerr*). *Sepala* 3; duo lateralia oblongo-lanceolata, acuta, 2.5 mm. longa, ciliata, nervosa; posticum (labellum) parce pubescens, limbo 3.75 mm. longo apice ad 5.5 mm. diametro, calcare 12 mm. longo integro. *Vexillum* elliptico-obovatum, apice parum retusum, 5.5 mm. longum, 5 mm. latum, dorso medio longitudinaliter carinatum, carina in mucronem rectum 1 mm. longum excurrente, glabrum; alae inter se liberae, 9 mm. longae, lobo basali quadrato 4 mm. longo et lato, distali oblongo apice retuso 5 mm. longo 3 mm. lato. *Ovarium* parce pubescens, 2.5 mm. longum. *Capsula* ad 13 mm. longa, medio 5 mm. lata, apice basique angustata, breviter crassius pilosa.

Chantabun, Kao Soi Dao, 1200 m., on rocks in evergreen forest, *Kerr* 9626.

Zanthoxylum Collinsae *Craib* [Rutaceae-Zanthoxyleae]; ab affini *Z. nitido* DC. foliolorum nervis lateralibus paucioribus supra impressis subtus prominentibus facile distinguendum.

Frutex scandens; ramuli primo puberuli, mox glabrescentes, cortice brunneo vel fusco-brunneo obtecti, lenticellis parvis prominulis vix conspicuis, spinis brevibus deflexis sat numerosis armati. *Folia* alterna, pinnatim 3–7-foliolata, petiolo 5–8 cm. longo incluso 15–33 cm. longa, petiolo basi terete superne cum rhachi anguste canaliculato, et petiolo et rhachi spinis deflexis armatis et puberulis; foliola opposita, oblonga vel elliptica, apice caudato-acuminata, basi inaequilaterialia, rotundata, saepissime etiam cordatula, usque ad 12 cm. longa et 5.8 cm. lata, chartaceo-coriacea, iuventute pagina utraque puberula, matura inferiore puberula, superiore glabra vel interdum inferne sparse puberula, nervis lateralibus utrinque 10–12 aliis intermediis parallelis saepe

minus tantum prominentibus additus rectis bene intra marginem anastomosantibus supra impressis subtus prominentibus, nervulis rete utrinque prominulum efficientibus, lateralia petiolulo circa 3 mm. longo puberulo supra canaliculato, terminalia petiolulo ad 4·5 cm. longo suffulta. *Flores* masculi in paniculas axillares e basi ramosas 3–5 cm. longas dispositi, ramulis inferne nudis, cymis ultimis sessilibus vel inferioribus pedunculo ad 3 mm. longo suffultis, pedicellis et bracteis 1–2 mm. longis, partibus omnibus puberulis sicco fuscis. *Sepala* sat crassa, deltoidea, obtusa, circa 1 mm. longa, extra puberula, intra glabra. *Petala* 4–5, oblongo-ovata, apice acumine incurvo instructa, 2·25 mm. longa, 1·5 mm. lata, extra puberula, intra glabra. *Stamina* 4–5, glabra, filamentis 3 mm. longis, antheris 1 mm. longis breviter apiculatis. *Discus* brevis, glaber. *Pistillodium* glabrum, circa 1·5 mm. altum.

Sriracha, Tapibut, 150 m., Mrs. D. J. Collins 705 (*type*).
Sriracha, Nawng Kaw, 50–70 m., evergreen forest, Kerr 6795,
Marcan 1184.

***Dalbergia abbreviata* Craib** [Leguminosae-Dalbergieae]; ab affini *D. Pierreana* Prain foliolis maioribus recedit.

Frutex volubilis; ramuli primo densius pubescentes, mox glabri, cortice fusco-brunneo vel rubro-brunneo lenticellato obtecti. *Folia* 15–19-foliolata, ad 15 cm. longa, petiolo communi 10–15 mm. longo cum rhachi densius pubescente suffulta; stipulae fugaces; foliola oblonga vel lanceolato-oblonga, apice rotundata vel obtusa, interdum apiculata, basi inferiora rotundata, superiora rotundato-cuneata vel cuneata, circa 4 cm. longa et 1·5 cm. lata, chartacea, pagina utraque viridia, inferiore parum pallidiora, utraque primo sericea, mox pilis adpressis subsparsae tecta, nervis lateralibus utrinque circa 8 intra marginem anastomosantibus obscuris, petiolulis 2–3 mm. longis dense pubescentibus suffulta. *Paniculae* et e parte inferiore efoliata ramulorum hornitorum et e tuberculis in ramulis vetustioribus ortae, dense pubescentes vel subtomentosae, 3–4 cm. (pedunculo communi circa 1·5 cm. longo incluso) longae; pedicelli circa 2 mm. longi; bractae oblongo-ellipticae, 2 mm. longae, persistentes; bracteolae 2, circa 1·5 mm. longae, ad calycis basem positae, sub anthesin persistentes. *Calyx* extra adpresse ferrugineo-pubescent, intra superne parce pubescens, basi pilosus; tubus 2·5 mm. longus; lobus anticus paululo ultra 1 mm. longus, lateralibus subaequalis; lobi postici late deltoidei, 1 mm. longi, basi 2 mm. lati, aliis multo latiores. *Vexillum* refractum, limbo subrotundato circa 3 mm. diametro intra medio parce piloso dorso basi medio pilis paucis instructo; stipes 2 mm. longus, utrinque superne pilis paucis instructus; alae 3·5 mm. longae, 1·75 mm. latae, basi latere altero cuneatae, altero cordatae; carina 3 mm. longa, 2·3 mm. lata, basi subtruncata, stipite 2·3 mm. longo suffulta. *Stamina* monadelpha, tubo intra inferne piloso. *Ovarium* vix 3 mm. altum, sutura ventrali adpresse pilosum, stipite circa 1·5 mm. longo piloso suffultum, stylo subulato 1·5 mm. longo, ovulis 2. *Legumen* samaroideum, ligulatum vel late ligulatum,

4-7 cm. longum, 1.4 cm. latum, glabrum vel sutura pilis brevibus hic et illic instructum, reticulatum, sutura dorsali anguste alatum, stipite circa 5 mm. longo suffultum; semina 1-2.

Doi Sutep, 700-950 m., *Kerr* 3554 (*type*), 1773, 3554A.

Quisqualis prostrata *Craib* [Combretaceae-Combreteae]; a speciebus aliis ramis prostratis, a *Q. densiflora* var. *parvifolia* Ridl. foliis haud acuminatis, alabastris minus pubescentibus recedit.

Fruticulus ramulis sterilibus prostratis ad 60 cm. longis crispatis puberulis vel breviter pubescentibus teretibus. *Folia* opposita vel subopposita, ovata vel subelliptica, apice emarginata, subtruncata, vel obtusa, costa excurrente breviter apiculata, basi rotundata vel cordata, 3.5-6.5 cm. longa, 2-4 cm. lata, chartacea, sicco viridia, utrinque pustulata, supra ad costam puberula, subtus pilis paucis ad costam nervosque laterales instructa et saepe ad nervorum axillos pilosa, nervis lateralibus utrinque 5-7 intra marginem anastomosantibus supra conspicuis interdum impressis subtus prominentibus, nervulis supra conspicuis vel subprominulis subtus subprominulis, margine integra, saepe recurva, ciliolata; petiolus 2-3 mm. longus, breviter crispatis pubescens. *Racemi* breves, ramulos laterales circa 8 cm. longos terminantes; flores subvirides vel albi, mox punicei (ex *Kerr*); bracteae lanceolatae, acuminatae, ovaria superantes, deciduae vel rarius diutius persistentes. *Receptaculi* tubus 11 mm. longus, extra parce pilosus, intra pilis paucis instructus. *Sepala* 5, e basi deltoidea subulato-acuminata, 2 mm. longa, basi 0.75 mm. lata, dorso pilis paucis sat longis instructa, intra glabra, ciliata. *Petala* 5, linearia vel spatulato-linearia, obtusa, 3.75 mm. longa, 1 mm. lata, utrinque puberula, ciliata. *Stamina* sub-biseriata, petalis breviora. *Ovarium* 3 mm. altum, pubescens, 5-angulare, ovulis 2-3 pendulis, funiculis elongatis; stylus petalis brevior, receptaculi tubo adnatus.

Utaradit, 100 m., trailing on open grassy ground, *Kerr* 5891 (*type*). Supanburi, Ban Nang Buat, 20 m., open scrub, *Kerr* 6994. Saraburi, Mênam Sak, 20 m., limestone rocks, *Kerr* 6994a.

Rhodamnia siamensis *Craib* [Myrtaceae-Myrteae]; a *R. cinerea* Jack, pedunculis ubi evolutis et pedicellis petiolis conspicue longioribus, floribus maioribus, petalis dorso sericeis recedit.

Frutex 10-15-pedalis (ex *collectoribus*); ramuli iuventute sericei, mox glabrescentes, cortice brunneo longitudinaliter fissi tecti. *Folia* lanceolata vel oblongo-elliptica, apice acuminata, acuta, basi cuneata, ad 7.5 cm. longa et 2.8 cm. lata, chartacea vel coriaceo-chartacea, supra iuventute sericea, cito glabrescentia, demum fere glabra, subtus sericea, e basi trinervia, nervis lateralibus fere ad imum apicem currentibus, costa etiam saepe nervis duobus lateralibus supra impressis, tribus subtus prominentibus, nervis secundariis (e costa ortis) numerosis inter se parallelis plus minusve reticulatis supra conspicuis parum elevatis subtus paucis saepe conspicuis, petiolo circa 5 mm. longo supra canaliculato

indumento ei ramulorum simili oblecto suffulta. *Flores* axillares, vel pedunculo communi evoluto vel pedicellis fasciculatis, et pedunculo et pedicellis petiolo duplo longioribus indumento ei ramulorum simili oblectis; bracteolae duae, circa 1.5 mm. longae, ad pedicelli apicem positae, receptaculo adpressae. *Receptaculum* sericeum, circa 2.5 mm. longum. *Calyx* 2.5-3.5 mm. longus, lobis inter se vix aequalibus oblongis apice rotundatis extra sericeis intra superne pilis paucis adpressis instructis. *Petala* oblongo-ovata, apice rotundata, basem versus angustata, circa 8 mm. longa et 4 mm. lata, extra sericea, intra glabra, ciliata. *Stamina* petalis paululo breviora, glabra. *Stylus* petalis paululo longior, superne gradatim angustatus. *Fructus* plus minusve globosus, circa 8 mm. diametro, subsericeus, calyce persistente vel deciduo.

Nawng Yai Bu, 15 m., scrub jungle, *Kerr* 2147 (type), *Mrs. D. J. Collins* 730. Sriracha, 5-12 m., *Mrs. D. J. Collins* 193, *Kerr* 4233. Petchaburi, 6 m., *Mrs. D. J. Collins* 595. Hua Hin, near beach, 2 m., *Marcan* 342. Prachuap, Bangtapan, evergreen forest on coast, 10 m., *Winit* 508. Kaw Pangan, *Robinson*. Chantabun, Lem Sing, sea-shore, *Marcan* 1346.

var. *latifolia* *Craib*, a typa foliis elliptico-ovatis basi rotundatis vel truncato-rotundatis ad 8.3 cm. longis et 4.5 cm. latis, bracteolis fere duplo longioribus, corolla ad 1 cm. longa distinguenda.

Nawng Kaw, edge of clearing in evergreen jungle, 30 m., *Kerr* 2051.

The true *R. cinerea* Jack (*R. trinervia* Blume), so far as our specimens go here, does not seem to occur in Siam except in the extreme south, where it has been collected on both sides of the Peninsula (in Satul by Ridley and in Pattani by Kerr!). M. Gagnepain, who elaborated the Myrtaceae in Fl. Gen. Indo-Chine, refers a Petchaburi plant to *R. trinervia*, but the description in this flora suggests that it has been based, at least in part, on the plant now described as *R. siamensis*. It is possible therefore that the Petchaburi plant may be referable rather to the latter species which has been collected at Petchaburi as well as a little to the north and to the south of that district.

The latest author (so far as I can trace) to deal with this plant was Ridley in his Flora of the Malay Peninsula, where the Kaw Pangan plant is referred to but left unnamed.

Didymocarpus bicolor *Craib* [Gesneraceae-Cyrtandreae]; inter species caule evoluto et floribus paniculatis corollae labio antico pallide viridi bene distincta.

Caulis erectus, simplex vel e basi pauci-ramosus, circa 5 cm. altus, viridis, pilis divergentibus albis longiusculis et brevioribus glanduloso-capitatis tectus. *Folia* superiora opposita, inferiora subopposita vel alterna, ovata, late ovata, vel oblongo-ovata, apice obtusa, basi rotundata vel subtruncata, saltem inferiora inaequilaterialia, usque ad 7 cm. longa et 5.5 cm. lata, supra viridia, subtus pallide viridia, supra molliter pubescentia, subtus ad costam

nervosque laterales pubescentia, nervis lateralibus utrinque 5-7 supra parum impressis subtus prominentibus, nervulis supra fere obsoletis subtus paucis subprominulis, margine crenulato-serrata, ciliata, petiolo 1-3 cm. longo supra plus minusve canaliculato indumento ei caulis simili tecto suffulta. *Inflorescentia* ex axillis superioribus orta, pedunculo communi ad 5.5 cm. longo apice bracteis duabus viridibus saepe basi rubro-tinctis late ovatis circa 6 mm. longis glabris vel pilis longiusculis glanduloso-capitatis plus minusve ciliatis pilis longiusculis albis divergentibus glanduloso-capitatis subsparsae instructo suffulta; pedunculus cymae gerens vel saepissime iterum cymosim furcatus, pedunculis partialibus ad 1.5 cm. longis inferne glabris superne pedunculo communi similiter tectis, pedicellis terminalibus circa 1 cm. longis glabris vel apice pauci-pilosis viridibus vel saepissime rubro-tinctis; alabastra glabra, extra nitida, vinosa, apice viridia, 5-umbilicata. *Sepala* inter se libera, subviridia, apice rubra, lineari-lanceolata, obtusa, 3-3.5 mm. longa, 1-1.5 mm. lata, duobus anticis aliis paulo maioribus, glabra. *Corollae* glabrae tubus vix 2 cm. longus, basi circa 4 mm. diametro, paulo lateraliter compressus, subrectus; labium anticum pallide viride, 8.5 mm. longum, 10 mm. latum, 3-lobatum, lobis transverse oblongis apice truncatis vel rotundato-truncatis ad 3.5 mm. longis et 6 mm. latis, posticum bifidum, segmentis circa 2 mm. longis et 2.5 mm. latis subquadratis apice rotundatis vel subtruncatis. *Stamina* 2, antica, filamentis pallidis circa 4 mm. longis, antheris inter se cohaerentibus puberulis corollae faucem vix attingentibus; staminodia columnaria, pallida, ad 1 mm. longa, interdum minuta vel haud evoluta. *Pistillum* 18 mm. altum, basi disco 1.5 mm. alto cinctum, stipite glabro, ovario inferne rubro-suffuso superne pallide viridi cum stylo pallide viridi pilis brevibus glanduloso-capitatis subsparsae tecto, stigmate viridi papilloso obsolete 2-lobulato.

Pu Tong, 1000-1200 m., *Kerr*.

Roots and seed collected in above locality were forwarded by Dr. Kerr. The plants flowered in Aberdeen in 1924 and the description has been drawn up from the living material.

***Didymocarpus insulsa* Craib** [Gesneraceae-Cyrtandreae]; a *D. bicolore* Craib corollae labiis colore tubo similibus inter alia recedit.

Caules pauci, erecti, 7-13 cm. alti, inferne mox brunnescentes, superne ad nodos brunnescentes, aliter virides, teretes. *Folia* interdum alterna, saepissime 3-pseudoverticillata, oblonga, oblongo-ovata, vel rarius oblongo-obovata, apice obtusa, basi inaequilateralia, latere altero rotundato altero rotundato-cuneata, 5-10 cm. longa, 3-5.5 cm. lata, sat rigida, supra viridia, subtus pallidiora, pagina superiore squamis ferrugineis cruciatim capitatis et pilis brevibus albis sparsis, inferiore squamis similibus instructa, nervis lateralibus utrinque 5-7 supra conspicuis subtus prominentibus, nervulis vix conspicuis, margine crenato-serrata, petiolo ad 2 cm. longo supra conspicue canaliculato inferne brunneo-tincto suffulta.

Cymae axillares, pedunculo communi circa 4 cm. longo incluso ad 9 cm. longae, 8 cm. latae, pedunculo communi squamulis ferrugineis plus minusve sparse tecto, apice bracteis duabus foliaceis ovatis viridibus ad 6 mm. longis sessilibus instructo, pedunculis partialibus circa 17 mm. longis pilis sat longis glanduloso-capitatis albis instructis apice 2-bracteatis iterum ramosis, pedunculis ultimis brevioribus, pedicellis ad 11 mm. longis, pilis capitatis similibus tectis. *Sepala* 5, cito recurva, plus minusve rubro-tincta, lineari-lanceolata vel lanceolata, obtusa, ad 3 mm. longa, extra squamulis ferrugineis tecta, intra glabra. *Corollae* lilacineae vel iuventute apice purpureae tubus omnino glaber, rectus, 15 mm. longus, parte dimidia inferiore 3 mm. diametro, superne inflatus et parum lateraliter compressus; labium inferum 3-lobatum, lobis late oblongis vel rotundato-oblongis apice rotundatis ad 6 mm. diametro, superum 2-lobatum, lobis parum reflexis rotundatis ad 3 mm. longis et 4.5 mm. latis. *Stamina* fertilia 2, filamentis albis superne pilis paucis albis brevibus glanduloso-capitatis instructis 5 mm. longis 1 cm. supra corollae tubi basem inserta, staminodiis 3 parvis albis glabris, antheris coalitis apice et basi breviter albo-barbatis. *Discus* brevis, vix 2 mm. longus, ovarii basem cingens. *Pistillum* 1.75 cm. longum, paulo exsertum, stigmatе viridi excepto album, glabrum; stigma breviter papillosum, ambitu rotundato-oblongum, centro concavum.

Plants raised from seed received from Dr. A. F. G. Kerr flowered at Aberdeen in October 1925 (Herb. Kew.). On these the description is based.

Didymocarpus tristis *Craib* [Gesneraceae-Cyrtandreae]; ab affini *D. insulsa* Craib caule breviorе, foliis latioribus basi cordatis, calyce et corolla paulo maioribus, sepalis haud semper patulis recedit.

Caulis erectus, vix 2 cm. altus, viridis, ad nodos rubro-brunneus, pilis albis brevibus adpressis sparse instructus et conspicue aureo-squamulosus. *Folia* opposita, oblonga, oblongo-ovata, vel late ovata, apice obtusa, basi altius cordata vel iuvenilia suborbicularia et apice breviter acuminata, parum inaequaliter alata, matura 6-10 cm. longa et 4-7.5 cm. lata, supra viridia, pilis albis sat rigidis subadpressis sparse tecta, subtus pallide viridia, pilis paucis albis brevibus ad costam nervosque laterales et marginem versus instructa, praetereaue pagina utraque squamulis parvis aureis ornata, nervis lateralibus utrinque 6-8 supra conspicuis subtus prominentibus, nervulis obscuris, margine serrulata vel crenulato-serrulata, petiolo ad 4 cm. longo supra canaliculato viridi vel plus minusve rubescente indumento ei caulis simili tecto suffulta. *Cymae* axillares, folia aequantes vel paulo superantes, pedunculo communi 8 cm. longo squamulis aureis ornato inferne subglabro superne pilis paucis brevibus albis hic et illic et longioribus glanduloso-capitatis sparsissime instructo apice bracteis duabus circa 2 mm. longis ornato suffultae; pedunculi partiales 2-2.5 cm. longi, plus minusve rubescentes, pilis elongatis glanduloso-capitatis et squamulis aureis

sparse instructi, apice bibracteati; pedicelli 1-1.3 cm. longi, indumento ei pedunculorum partialium simili sed pilis praesertim apicem versus magis numerosis instructi et squamulis saepe deficientibus. *Sepala* linearia, apice obtusa, parum incrassata, glabra vel dorso superne interdum pilis paucis instructa, 4.5-6 mm. longa, 1-1.25 mm. lata, sub anthesin patula vel obliquo-patula, mox corollae adpressa, dein parum reflexa. *Corollae* pendulae glabrae tubus 2.4 cm. longus, inferne 3.5 mm., apice 5.5 mm. diametro; labium anticum 1 cm. longum, 1.5 cm. latum, 3-lobatum, lobis subrotundatis 6-7 mm. diametro, posticum 2-lobatum, lobis 2.5 mm. longis 5 mm. latis rotundatis. *Stamina* duo antica fertilia. filamentis 5 mm. longis glabris, antheris circa 1.5 mm. longis apice et basi barbatis; staminodia 3, parva, glabra. *Discus* 3 mm. altus, ruber vel purpureo-ruber, apice basique viridis, ore obliquus, saepe plus minusve denticulatus. *Ovarium* stipite incluso 1.8 cm. longum, glabrum, rubrum, stylo 4 mm. longo glabro albo, stigmate obliquo apice concavo.

Kao Soi Dao, 1400 m., on rocks, *Kerr*.

Described from plants grown at Aberdeen from seed collected by Dr. Kerr in above locality. The plants flowered for the first time in October, 1925.

Chirita Marcanii *Craib* [Gesneraceae-Cyrtandreae]; a *C. tubulosa* Craib corolla intense aurantiaca facile distinguenda.

Herba, ut videtur, annua; caulis sub anthesin circa 24 cm. altus, inferne subpurpurascens, superne viridis, basi circa 1 cm. diametro, pilis rigidis albis subreflexis inferne sparsius superne densius instructus. *Folia* opposita, ovato-oblonga, apice obtusa, basi cordata, ad 19 cm. longa et 12 cm. lata, supra viridia subtus pallide viridia, pagina superiore pilis erectis albis sat rigidis subhirsuta, inferiore ad costam nervosque laterales similiter subhirsuta, aliter sparse pubescentia, nervis lateralibus utrinque usque ad 22 supra parum impressis subtus prominentibus, margine ciliata, petiolo sat robusto ad 20 mm. longo suffulta. *Pedunculus* communis basi petiolo adnatus; pedunculi partiales biflori, circa 2 cm. longi, indumento ei caulium simili tecti, pedicellis ad 2.5 cm. longis similiter tectis. *Sepala* 5, viridia, imbricata, recta vel post anthesin apice parum recurva, dorso pilis sat longis transverse septatis tecta, ciliata, intra superne parce pubescentia, lanceolata, circa 2.5 cm. longa et 0.5 cm. lata, post anthesin ad 1 cm. lata. *Corolla* intense aurantiaca, basi excepta extra pilis transverse septatis glanduloso-capitatis densius instructa; tubus fere 3.5 cm. longus, basi pallidus, 1 cm. supra basem defractus, dein per 1 cm. gradatim ampliatus, dein subitius inflatus, apice 12 mm. diametro; lobus infimus subplanus, 12 mm. longus et 15 mm. latus, aliis paulo minoribus et parum reflexis. *Stamina* 2, antheris connatis barbatis, filamentis superne incrassatis. *Ovarium* viride, basi disco brevi pallido cinctum, inferne glabrum, superne pubescens, 12 mm. longum, stylo 25 mm. longo inferne pubescente superne glabro, stigmate bilamellato papilloso.

Muak Lek, limestone rocks, Marcan 1872.

Plants raised from seed of the above collection flowered at Aberdeen in 1925 and formed the basis of the description.

Boea Harroviana Craib [Gesneraceae-Cyrtandreae]; a *B. Kerrii* Craib foliis saepe ternatis basi rotundatis cordatulis facile distinguenda.

Caulis erectus, simplex, brevis vel ad 5 cm. altus, obtuse angulatus, arachnoideus, internodiis brevibus vel ad 3 cm. longis. *Folia* saepe ternata, ovata vel oblongo-ovata, apice obtusa, basi rotundata, cordatula, inaequilateralia, ad 8 cm. longa et 5 cm. lata, coriacea, supra viridia, laxae arachnoideae vel demum fere glabra, subtus subcinnaeomeae, dense arachnoideae, costa subtus valde prominente, nervis lateralibus utrinque 7-8 supra conspicuis subtus prominentibus, nervulis inconspicuis, margine crenulato-serrata, petiolo 3-6.5 cm. longo supra superne canaliculato pallide cinnaeomeo-arachnoideo suffulta. *Pedunculi* communes axillares, 8-16 cm. longi, apice cymosim ramosi; pedunculi partiales ad 4 cm. longi; pedunculi ultimi circa 1.5 cm. longi; pedicelli ad 8 mm. longi, pedunculis et pedicellis arachnoideis; bracteae infimae foliaceae, ad 13 mm. longae et 5 mm. latae, superiores gradatim minores; flores pallidi. *Calyx* 4 mm. longus, sub-bilabiatus, extra arachnoideus, intra glaber. *Corolla* glabra, apice ad 1.4 cm. diametro; tubus antice 7 mm., postice 5 mm. longus; labium anticum 3-lobatum, lobis rotundatis fere 6 mm. diametro, posticum 2-lobatum, lobis brevibus apice rotundatis. *Stamina* 2, filamentis viridibus puberulis 2.5 mm. longis, antheris apice connatis 3 mm. longis pallidis apice brunnescentibus poro apicali dehiscentibus; staminodia 3, filiformia, parva. *Pistillum* circa 1 cm. longum, ovario glabro, stylo exserto puberulo, stigmate obliquo papilloso.

Mê Ping Rapids, Kéng Soi, 350 m., common on rocks, flowers pale mauve, *Kerr* 4629.

Thunbergia nivea Craib [Acanthaceae-Thunbergieae]; species nova caulibus brevibus, floribus magnis niveis cognoscenda.

Caules erecti, 12-40 cm. alti, vel volubiles, basi lignosi, iuven-tute densius hirsuto-pilosi, basem versus fusci et puberuli. *Folia* subovata, ovato-lanceolata, vel lanceolata, rarius oblongo-elliptica, superiora apiculata, inferiora obtusa, rarius rotundata, basi rotundata vel cordatula, ad 8.5 cm. longa et 4.5 cm. lata, sicco rigida, supra hirsuta, demum scabrida, subtus pallidiora, pilosa, e basi 5-nervia, nervis supra conspicuis saepe impressis subtus prominentibus, nervis secundariis (e costa ortis) utrinque circa 5 demum supra impressis subtus prominentibus, nervulis demum supra impressis subtus prominulis, margine subintegra vel saepissime irregulariter pauci-dentata vel lobulata, petiolo ad 1.4 cm. longo dense hirsuto-piloso supra canaliculato suffulta. *Pedicelli* axillares, solitarii vel gemini, 3-5 cm. longi, pilis divergentibus tenuibus tecti, virides, basi rubro-suffusi; bracteolae 2, sub anthesin virides, mox pallescentes, inter se liberae, ovatae vel late ovatae, basi late

cordatae, obtuse apiculatae, ad 2 cm. longae et 1.4 cm. latae, e basi 5-nerviae, nervis extra prominentibus intra impressis, dorso pilosae, intra glabrae, ciliatae, sessiles. *Calyx* 2.5-3.5 mm. longus, puberulus, vix ad medium 8-lobatus, lobis saepe irregulariter iterum lobulatis. *Corollae* albae oculo pallide luteo-viridis tubus vix 3 cm. longus, lateraliter compressus, apice constrictus, extra pubescens, intra inferne ad filamentorum insertionem pilosus, aliter glaber, limbus 5 cm. diametro, 5-lobatus, lobis cuneatis apice ad 2.3 cm. latis dorso inferne pubescentibus hic et illic ciliatis. *Stamina* 4; filamenta 2.5-6 mm. longa, 5 mm. supra corollae basem inserta, glabra; antherae inter se liberae, sagittatae, circa 3.5 mm. longae, glabrae. *Ovarium* viride, calycem paulo superans, hic et illic pilis paucis instructum vel subglabrum, basi disco brevi cinctum; stylus 2.8 cm. longus, albus, glaber. *Fructus* generis, puberulus, circa 2 cm. longus; semina globosa, basi concava, echinato-tuberculata, puberula.

Surin, Sangka, 200 m., open spaces in evergreen forest, Kerr 8280.

Plants raised from seed collected in the above locality and forwarded by Dr. Kerr flowered at Aberdeen in 1924 and 1925. The description has been drawn up mainly from the living material.

Globba (Marantella) Winitii C. H. Wright (Scitamineae-Zingiberaceae); *G. atrosanguineae* Teysm. et Binn. affinis, petiolis elongatis ovarioque levi differt.

Caulis 6 dm. altus. *Folia* oblongo-lanceolata, basi cordata lobis superimpositis, acuminata, glauca praesertim facie inferiore, subtus minute puberula et ad costam sparse villosa, 18 cm. longa, 5.5 cm. lata; petiolus ad 7.5 cm. longus; vagina ad 16 cm. longa, glauca. *Panicula* axillaris, nutans, parce ramosa; bractee ovatae, acutae, demum reflexae, 3 cm. longae, 1.8 cm. latae, inñmis aggregatis sterilibusque; pedicelli inferiores 2.5 cm. longi, tenues, virides, glabri, nitentes. *Calycis* lobi oblongi, obtusi, 3 mm. longi, virides. *Corolla* lutea; tubus tenuis, infra rectangularim sursum curvatus, pubescens, 9 mm. longus; lobi dexteri, cymbiformes, 4 mm. longi, 2 mm. lati. *Labellum* breviter bilobatum, obtusum, 7 mm. longum; staminodia lateralia oblonga, obtusa, dextera, 8 mm. longa, 2.5 mm. lata. *Filamentum* 2 cm. longum; anthera 2 mm. longa, utrinque acute bicalcarata. *Ovarium* leve, viride.

Lampun, Mè Kaw, 420 m., moist shady banks of streams; seems to be very local; *Winit* 1228.

Roots collected in the above locality by Phra Winit Wanadorn were received at Kew and Aberdeen from Dr. A. F. G. Kerr. The plants flowered in July, 1925, and the description has been drawn up from the Kew plant. This plant produced three axillary inflorescences, two of which were in flower at the same time. At first the peduncles appear to be one-flowered, but at length branch and bear other flowers. The conspicuous bracts are magenta of the shade depicted in Klincksieck et Valette's Code des Couleurs

No. 556 and the corolla waxy yellow No. 161 of the same code. At first the bracts are erect, but quickly become reflexed and appressed to the rachis.

XXIII.—NOTES ON KISSANIA AND THE GEOGRAPHICAL DISTRIBUTION OF THE LOASACEAE.

—J. E. DANDY.

Kissenia, the only genus of the *Loasaceae* in the Old World, is confined to desert regions in Southern Arabia, Somaliland and South-West Africa. Its range is divided into two isolated and relatively small areas (fig. 1). The first, in lat. 10° – 15° N, includes Aden and extends into Hadramaut and across the Gulf of Aden into Somaliland. The other is in South-West Africa, in latitude approximately 20° – 30° S.



FIG. 1.—Geographical distribution of the *Loasaceae* (a, *Kissenia*).

The name *Kissenia* was first mentioned by Robert Brown in manuscript at the British Museum. He based his genus upon an Arabian specimen, and named it in honour of the collector, Kissen, a traveller in Arabia. The first generic description to be published was by Endlicher in 1842 (*Gen. Plant.*, Suppl. ii, p. 76), who, by an error in spelling, gave the name as *Fissenia* and recognised one species, *F. capensis*. This name he regarded as synonymous with the *Cnidone mentzelioides* of E. Meyer, given in manuscript to Drege's specimens from the Cape.

Hitherto, the Arabian and African plants have been regarded as belonging to the same species, but the peculiar geographical distribution of the genus has given rise to attempts to distinguish two species. The two regions occupied by *Kissenia* are not only

in different hemispheres, but are, as Brongniart (Bull. Soc. Bot. Fr. vii, p. 899) points out, in different latitudes in the two hemispheres. Collection of material at Aden by Courbon in 1860 led Brongniart to send a specimen to J. D. Hooker for comparison with Cape specimens. Hooker apparently could find no specific difference, and T. Anderson (Journ. Proc. Linn. Soc. v, Suppl., p. 42), who also compared the plants, failed to separate them. Forty years later, however, Urban (Monogr. Loas. in Nov. Act. Nat. Cur. lxxvi, pp. 119 and 120) found that "*specimina Asiatica et Africana satis differunt*," and observed that if better material were available, two well-defined varieties might be distinguished. Poor material, and the tendency of the period to take a broad view of species, probably accounted for the failure of the earlier attempts to separate the plants.

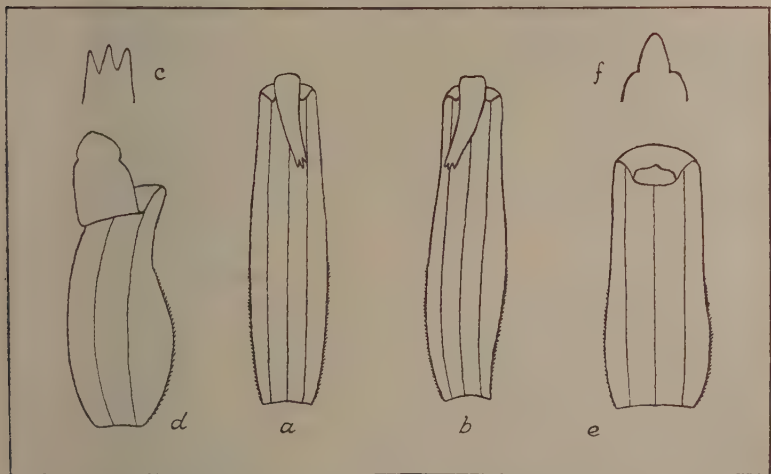


FIG. 2.—*Kissenia*.—*a, b*, scales, *c*, tip of scale, of specimens from Arabia; *d, e*, scales, *f*, tip of scale, of specimens from S.W. Africa.

A critical examination of numerous specimens in the Kew Herbarium has now fulfilled Urban's speculation. Marked differences are found in the nectariferous scales and in the leaves, which, taken in conjunction with the geographical distribution, justify the segregation of the plants into two species, the one confined to Southern Arabia and Somaliland, the other to South-West Africa.

The scales are 5 in number and alternate with the petals, of which they were formerly regarded as constituting a second whorl. Each scale is the morphological equivalent of 3 staminodes, united and modified to form a concave organ terminating in a ligule, which is reflexed and usually again folded once (fig. 2, *d, e*) or twice (*a, b*). Viewed from the back (or convex side) and disregarding the ligule, the scale in the Arabian specimens is narrowly rectangular,

while the ligule is narrowly lanceolate, and distinctly tripartite at the tip (fig. 2, *a, b, c*). In the South African plant the scale is broader in proportion, rectangular or ovate-truncate, the ligule being broader, more or less rectangular, obtuse, and entire or obscurely 3-lobed at the tip (fig. 2, *d, e, f*).

Accompanying these differences in the scales there is a difference in the shape of the leaves. These in the Asiatic form are orbicular or broadly ovate, usually not distinctly 3-lobed, and cordate at the base (fig. 3, *d-f*). In the South African specimens they are narrower, varying from ovate to ovate-lanceolate at the apex of the stem, usually markedly 3-lobed, and acute or obtuse, never cordate, at the base (fig. 3, *a-c*).

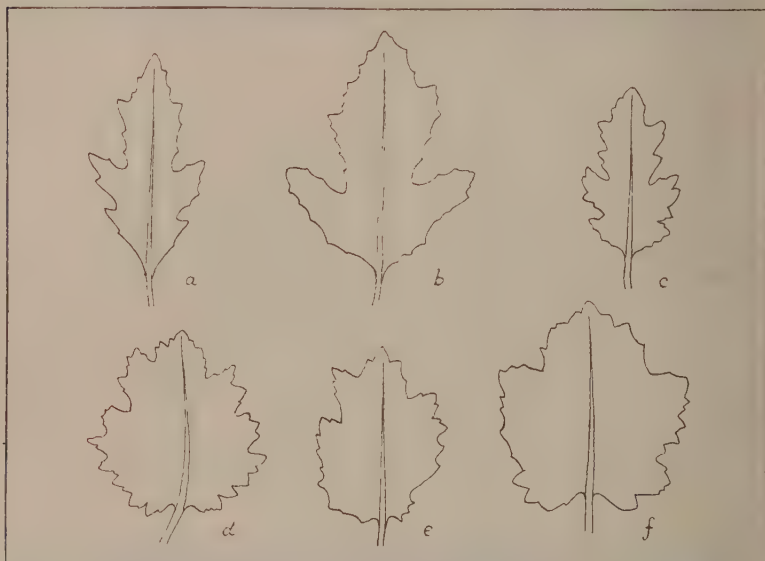


FIG. 3.—*Kissenia*.—Leaves, *a, b, c*, of specimens from S.W. Africa; *d, e, f*, of specimens from Arabia.

I am much indebted to Professor Lecomte for allowing me to examine Revoil's specimen from Somaliland, which agrees perfectly in both leaves and scales with the Arabian plants.

It is suggested that the name *Kissenia spathulata*, given by R. Brown to Kissen's specimen, be limited to the Arabian species, and *K. capensis* to that from South-West Africa. The species are now as follows :

1. *Kissenia spathulata* R. Br. ex T. Anders. in Journ. Proc. Linn. Soc. v, Suppl., p. 43.

Folia orbicularia usque late ovata, basi cordata, 3-7-lobulata vel rarius lobata, irregulariter dentata. *Squamae* ligula exclusa a dorso anguste rectangulares, 3-4-plo longiores quam latiores, ligula reflexa anguste lanceolata acuta apice tripartita.

SOUTHERN ARABIA. Aden: Wadi Maalla, *Schweinfurth* 27! Cirque of Shamsan, *Deflers* 2! Northern slopes, *Perry*! Shugra, *Schweinfurth* 129! Without locality, *Hunter*! *Thomson*! *Courbon*! *Balfour*! Hadramaut: Kishin Bay, *Kissen* (type)! Alrail, 600m., *Lunt* 127! Goldnore Valley, *Lunt* 313; Wadi Bayren, *Hirsch* 37.
SOMALILAND. Guedora Valley, *Revoil* 50!

2. **K. capensis** *R. Br. ex Harvey* in *Thes. Cap. i*, p. 61 (errore *Fissenia*).

Folia ovata usque ovato-lanceolata, basi acuta vel obtusa, plerumque 3-lobata, irregulariter dentata. *Squamae* ligula exclusa a dorso rectangulares vel ovato-truncatae, $1\frac{1}{2}$ –3-plo longiores quam latiores, ligula reflexa plus minusve rectangulari obtusa apice integra vel obsolete 3-lobata.—*Cnidone mentzelioides* E. Meyer in *Drege, Zwei Pflanz. Docum.*, p. 93, nomen; *K. (Fissenia) mentzelioides* *R. Br. ex Harvey* in *Thes. Cap. i*, t. 98.

SOUTH-WEST AFRICA. Hereroland, *Pechuel-Lösche*; Welwitsch, *Galpin and Pearson* 7631! Lat. 23°S, *Chapman and Baines*! Damaraland, without locality, *Een*! Keetmanshoop, *Dinter* 3556! *Durham* 14! Sandy valley leading down to Bethany Drift, *Pearson* 6951! Sandy flats near An'Aap R., *Atherstone* 10! Between Verleptpram and mouth of Gariep, *Drege* (type)! Rocks in kopje near Gabis, *Pearson* 4323! Hills at Wolveton, 520m., *Schlechter* 11439! Broken ground west of Pella, *Pearson* 3544! Without locality, *Drege*!

The peculiar geographical range of *Kissenia* aroused interest in the distribution of the remainder of the *Loasaceae*. In his monograph of the family, Urban (*Monogr. Loas. in Nov. Act. Nat. Cur. lxxvi*) recognised 13 genera, and 2 more have since been described. The 250 species are arranged in three subfamilies: *Gronovioideae*, *Mentzelioideae*, and *Loasoideae*. The *Gronovioideae*, with 4 genera and only 9 species, occupy an isolated position, being characterised by 5 stamens and one ovule pendulous from the apex of the ovary. The other two subfamilies have both numerous stamens and ovules, and parietal placentation.

Mentzelioideae (fig. 4). In the *Mentzelioideae* the numerous stamens are not collected into bundles, and nectariferous scales are lacking. This subfamily thus appears to be the most primitive group of the *Loasaceae*, and is therefore considered first.

Mentzelia, with about 64 species, is easily the largest genus, and probably represents the ancestral type of the family. It is spread over America from the North-Western United States to Patagonia, this being the range of the whole family, excepting *Kissenia*. One species, *M. aspera*, occurs over this whole range, including the Galapagos Is., West Indies, and Brazil, while another, *M. albescens*, is found in Texas and Northern Mexico, and in Chile and the Argentine. All the others are confined either to Mexico and the Western United States or to Western and Temperate South America. *Schismocarpus* (Blake in *Contr. Gray Herb.*, N.S. 53,

p. 61) is a monotypic genus from Oaxaca in Mexico, and, according to Gilg, is doubtfully distinct from *Mentzelia*.

Eucnide (10 spp.) occurs in Mexico and the South-Western United States; it shows advancement over *Mentzelia* in the protrusion of the placentae and the realisation of the tendency shown in that genus towards coherence of the petals at the base. *Sympetaleia* is still more highly evolved in this direction, having a tubular corolla. Its 3 species are confined to Lower California and the State of Sonora just across the Gulf of California.

The distribution, shown in fig. 4, supports the conclusion that *Mentzelia* is the most primitive type of the *Mentzelioideae*, and indicates Mexico and the South-Western United States as the centre of development of this subfamily. *Eucnide* and *Sympetaleia*

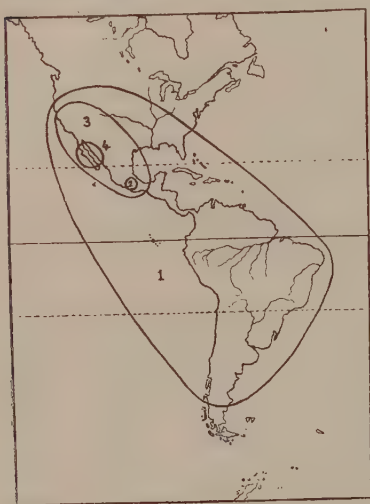


FIG. 4.—*Mentzelioideae*.—
1, *Mentzelia*; 2, *Schismocarpus*;
3, *Eucnide*; 4, *Sympetaleia*.

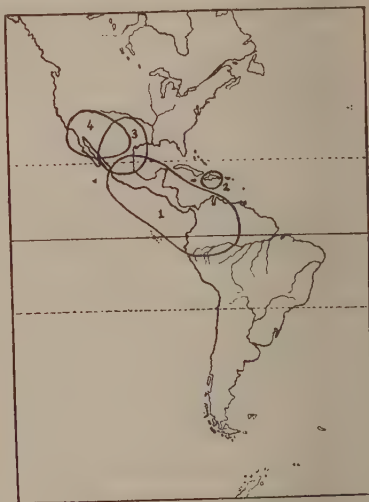


FIG. 5.—*Gronovioideae*.—1, *Gronovia*;
2, *Fuertesia*; 3, *Cevallia*;
4, *Petalonyx*.

appear to be comparatively recent products of evolution in this centre.

Loasoideae (figs. 1, 6, and 7). The members of this subfamily have the stamens grouped into bundles, the fertile opposite the petals and the sterile opposite the sepals. In the typical *Loasoideae* (i.e. *Loaseae* and *Kissenieae*) the staminodes are united to form nectariferous scales opposite the sepals.

Urban's first tribe, *Klaprothieae*, affords a link between this subfamily and the first in not having the staminodes united to form scales. Its two genera, *Klaprothia* and *Sclerothrix*, are both monotypic, and have tetramerous flowers. *Sclerothrix*, however, is the more advanced in possessing a twisted capsule, and is also the more widespread (fig. 6), extending from Mexico to Brazil, Peru, and the

Galapagos Islands. *Klaprothia* is confined to North-Western South America. The wider range of the more recent type is probably due to superior dehiscence mechanism afforded by the twisted capsule.

The remaining genera constitute the *Loasoideae* proper, of which *Loasa*, with a straight capsule, is the basal type. This, with 95 species, is the largest genus of the family, but is not so widely distributed as *Mentzelia*. The species are mainly concentrated between Peru and Patagonia, but by means of a few outliers the genus extends into Southern Mexico, while one species is restricted to Santo Domingo in the West Indies (fig. 7). *Scyphanthus* (2 spp.) is confined to a small region in the Andes of Chile. It

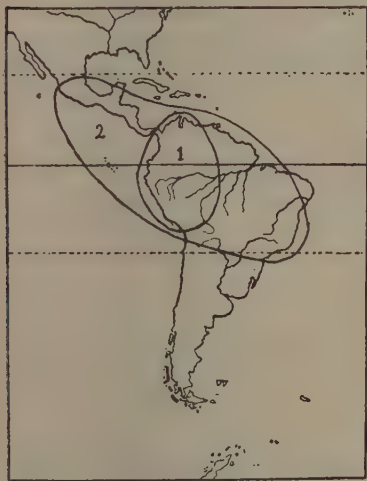


FIG. 6.—*Loasoideae* (*Klaprothieae*).—
1, *Klaprothia*; 2, *Sclerothrix*.



FIG. 7.—*Loasoideae* (*Loaseae*).—
1, *Loasa*; 2, *Scyphanthus*;
3, *Cajophora*; 4, *Blumenbachia*.

shews advancement over *Loasa* in the elongation and more complete dehiscence of the capsule.

The twisted capsule, as mentioned above, occurs in the *Klaprothieae*. This feature again appears in *Cajophora* and *Blumenbachia*. *Cajophora* is a large genus of about 60 species, in which the tendency towards twisting of the ovary is not absolutely fixed, a few species having straight fruits. The twisting of the capsule in *Sclerothrix* and *Cajophora* appears to afford an example of parallel evolution. The two cases differ, for in *Sclerothrix* the capsule dehiscence from the apex; in *Cajophora* the carpels remain attached at the tip. The distribution of *Cajophora* resembles that of *Loasa* in the south, but the former does not reach Central America. *Blumenbachia*, with 4 species, has a more elaborate capsule than *Cajophora*, and only extends from South-Eastern Brazil and Paraguay to Patagonia.

The distribution of the *Loaseae* (fig. 7) points to Chile and the Argentine as their centre of development, with *Loasa* as the most ancient type. *Cajophora* and *Blumenbachia*, with their more efficient dehiscence mechanism, may be more recent in origin than their range suggests.

Kissenia differs from the remainder of the *Loasoideae* in the bilocular ovary with 3 subapical ovules and in the sepals forming wings on the fruit. Its distribution (fig. 1) has already been considered. On the Wegener Theory of Continental Drift, the occurrence of *Kissenia* in South-West Africa would accord with the above conclusion as to the centre of development of the tribe *Loaseae*, but the presence of *K. spathulata* in Somaliland and Arabia offers a difficult problem. Probably *Kissenia* formerly extended across Africa from South-West Africa to what is now Southern Arabia, and the complete isolation of its present localities, perhaps through changes in elevation, has resulted in the slight differences noted above.

Gronovioideae (fig. 5). This, as stated above, is a small subfamily standing apart from the rest of the *Loasaceae* in possessing only 5 stamens, one pendulous ovule, and a one-seeded, indehiscent fruit. Its range extends from the South-Western United States to Ecuador, with one species in the West Indies.

The genera are somewhat scattered in their distribution. *Gronovia* (2 spp.) is the most widely spread, reaching from Central Mexico to Ecuador and Venezuela. *Fuertesia* (Urban in Ber. Deutsch. Bot. Ges. xxviii, p. 520) is monotypic and confined to the island of Santo Domingo; it has divided petals and is exceptional amongst the *Loasaceae* in being woody. Since the plant is a climber, this latter character is probably secondary and not primitive. *Cevallia* differs from *Gronovia* in the capitate inflorescence and the connectives produced as tongue-like appendages, a combination of characters found in many *Compositae*. It possesses 2 species, inhabiting New Mexico, Texas, and Mexico. In *Petalonyx* there is a tendency towards sterilisation of the androecium. Four species are known, of which two have all 5 anthers fertile and 4-locellate; a third has all 5 fertile, but the posticous one is sometimes 2- or 3- instead of 4- locellate; in the fourth species only the two anticus stamens are fertile. The genus is restricted to the South-Western United States and North-Western Mexico.

The distribution of the *Gronovioideae* (fig. 5) suggests that they had their origin in Central America, perhaps in the same region as the *Mentzelioideae*. There are no links connecting them with the rest of the family, and if they arose from the *Mentzelia*-type, they must have diverged from it at an early date. The most widespread genus, *Gronovia*, appears also to be the most primitive, but its range overlaps neither that of *Fuertesia* nor *Petalonyx*.

XXIV.—HUMBOLDT AND BONPLAND'S ITINERARY IN ECUADOR AND PERU. N. Y. SANDWITH.

At the end of December, 1801, or the beginning of January, 1802, Humboldt and Bonpland entered Ecuador from Colombia by the Puente de Rumichaca, and passing the great crevasse of Chota and the town of Ibarra, arrived at Quito on January 6th, 1802. Here they remained until July, and undertook expeditions to the neighbouring mountains of Antisana and Pichincha (ascended three times), as well as to others less well known. Towards the end of their stay the formidable ascent of the more distant Chimborazo was also accomplished, the party starting from Quito on June 23rd.

Some time during July the travellers left Quito and continued their journey south to Cuenca and Loxa, beginning with an attempt on Cotopaxi, which they had apparently postponed until after their departure from Quito, though it was not nearly so far distant as Chimborazo. Some days were spent at Cuenca, and again at Loxa, which was an important centre for the Cinchona forests. It is difficult to understand at what stage of their itinerary certain places in the coast region near the frontier of Peru and Ecuador were visited by Humboldt and Bonpland, unless this took place from Loxa; the dates of flowering (July and August) of species collected in these localities support this assumption; but Lambayeque at least lies perhaps too far south, and may have been visited from Huambos, Caxamarca or even from Truxillo. The absence of any detailed chronological account of Humboldt and Bonpland's travels in these countries has necessarily caused one or two difficulties of this kind. From Loxa the route lay south to the Rio Macara, which is the modern frontier of Ecuador and Peru, and on entering Peru the travellers proceeded through the district round the mountain of Ayavaca to Huancabamba, and from there in a south-easterly direction, through the province of Bracamoros, to the banks of the Upper Amazons, or more correctly of the Rio Marañon, which were clothed with *Andira* and *Bougainvillea*. After a month in this province, they returned to the Andes, and after passing the mines of Hualgayoc, and the city of Caxamarca with its famous Inca palace, descended to the coast at Truxillo. From Truxillo the route followed the coast down to Lima, where Humboldt and Bonpland stayed from October 23rd to December 5th, the day on which they took ship for Guayaquil. They reached the port on January 9th, 1803, and remained in this part of Ecuador until February 15th, when they left by sea for Mexico, landing at Acapulco on March 23rd.

For the convenience of botanists, the following itinerary is divided into two sections, the first containing all the localities which are in Ecuador, the second those in Peru. This division does not interrupt the main chronological sequence of the itinerary very seriously; it involves the insertion of the Guayaquil localities

under their special heading at the end of the section devoted to Ecuador; and a few places on the northern Peruvian littoral, which were apparently visited from Loxa in Ecuador, are placed in the Peruvian section under the most appropriate heading, with a note indicating that their position is geographical rather than chronological. Apart from this the headings and the places visited are placed as far as possible in the most likely chronological and geographical order, but mistakes may easily occur, as several places—notably round Ayavaca in Peru—have eluded discovery on even the best maps. Again, the evidence left by Humboldt is sometimes so vague that the sequence becomes decidedly theoretical, as for instance that of the localities visited between Huancabamba, the Rio Marañon and Huambos. The interruption of the continuous itinerary for several months at Quito introduced a special difficulty, which resulted in the decision to indicate the headings of the continuous itinerary in Ecuador by separate capital letters A, C, D, E, and the Quito headings by B. The localities visited from Quito, except those near Chimborazo, seemed to fall naturally under four headings, and these are titled B. 1, B. 2, B. 3, B. 4. The case of the Chimborazo localities was different. They were visited on a special expedition from Quito, but they lie so far to the south and so near the line of the later continuous route, that it seemed preferable to place them in heading C in their natural geographical position, once more indicating this chronological irregularity by a note. Many of the localities between Quito and Riobamba were obviously passed both on the expedition to Chimborazo and on the later journey south to Cuenca, and it would have been undesirable, as well as exceedingly difficult, to list them twice under two headings. The capital letters A, B, C, D are used again in the treatment of the Peruvian section.

Places which can be found on most maps are printed in black type except when, for example between Truxillo and Lima in Peru, many successive places equally merit this distinction, in which case the reason for so printing them at once disappears.

The altitudes are those given in Humboldt's classified lists of localities in the *Nova Genera et Species Plantarum*, vol. vii, pp. 379-382, 417, 418.

PRINCIPAL SOURCES OF INFORMATION.

1. Bruhns, K., Alexander von Humboldt, eine wissenschaftliche Biographie (Leipzig, 1872). Vol. i, Chapters v-vii. pp. 360-384 (travels in Ecuador and Peru). Beilagen, pp. 464-466 (chronology of travels in tropical America).

2. Humboldt, A. Atlas Géographique et Physique du Nouveau Continent (1814-1834).

3. Humboldt, A. Atlas Pittoresque: Vues des Cordillères, etc. (Paris, 1810).

4. Humboldt, Bonpland et Kunth, *Nova Genera et Species Plantarum* (Paris, 1825). Vol. vii, pp. 379-382, 417, 418 (classified 182

lists of localities in Ecuador and Peru); pp. 382-413, 418-429 (enumeration of plants collected in Ecuador and Peru, with their localities).

5. André, Édouard, "L'Amérique Équinoxiale" in Charton, *Le Tour du Monde* (Paris); 1883, xlv, 356-416 (numerous illustrations and several maps).

6. Whymper, E., *Travels amongst the Great Andes of the Equator* (London, 1892).

7. Spruce, R., *Notes of a botanist on the Amazon and Andes*, ed. Wallace, vol. ii, pp. 163-342 (London, 1908).

The following large maps, in addition to those mentioned under the separate headings of the itinerary, have been found useful:—

Villavicencio, *Carta Corografica de la Republica del Ecuador* (1858).

Wolf, T., *Carta Geografica del Ecuador* (1892).

Raimondi, *Mapa del Peru*, foja 1-7.

Mapa del Peru por la Sociedad Geografica de Lima (1912).

ITINERARY.

I. In Ecuador.

A. From Colombian frontier to Quito, end of December, 1801 or beginning of January, 1802—January 6th, 1802.

(*vide* H. B. K., *Nov. Gen.*, vii. 379-380; Humb. et Bonpl., *Voyage*, *Atlas Géogr.*, sér. 1, tt. 5, 22; *Atlas Pittor.*, pp. 241-2, pl. 42 (Cayambé); André in *Le Tour du Monde* 1879, xxxviii, 354, map; 1883, xlv, 339, map; Whymper, *Travels amongst the Great Andes of the Equator*, 1892, maps at end).

1 Puente de Rumichaca; 2 **Tulcan**; 3 Paramo del Boliche, 10,788 ft.; 4 Rio de Huaca; 5 Paramo de Puntas; 6 Hacienda de Chumban, 8,688 ft.; 7 Tusa; 8 El Dorado; 9 Cuesaca, 8,478 ft.; 10 Alto de Pucara (E. of Mira), 9,756 ft.; 11 San Vicente; 12 Valle de Chota, 4,962 ft.; 13 Villa de **Ibarra**, 7,104 ft.; 14 Nevado de **Cotocachi**, 15,420 ft.; 15 Cerro de **Imbabura**, 14,040 ft.; 16 **Otava**lo; 17 Nevado de **Cayambé**, 18,180 ft.; 18 San Antonio de Lulumbamba, 7,650 ft.; 19 Puente de Rio Guailabamba, 6,180 ft.; 20 Caraburu; 21 El Quinche; 22 Yaruqui; 23 Puembo; 24 Guapulo; 25 **Quito**, 8,952 ft.

B. 1. Quito, and localities in immediate neighbourhood lying chiefly south and east, January—July, 1802.

(*vide* H. B. K., *Nov. Gen.*, vii, 380; Humb. et Bonpl., *Voyage*, *Atlas Géogr.*, sér. 1, t. 27 (abbrev. H.); André in *Le Tour du Monde*, 1883, xlv, 388, 390, 403, maps (abbrev. A.); Whymper, *Travels amongst the Great Andes of the Equator*, 1892, maps at end (abbrev. W.); Spruce, *Notes of a botanist on the Amazon and Andes*, ed. Wallace, 1908, vol. ii, map facing p. 220 (abbrev. Spr.)).

26 **Quito**; 27 Rio Machangara (H.A.); 28 Panecillo (Javirac), 9,606 ft. (H.A. Spr.); 29 La Chilena (A.) ; 30 Cerritos de Izimbia (H.) or Ichimbia (A.) y Poingasi (Puengasi, W.); 31 Inaquito; 32 Magdalena (H.A.W.); 33 Llano de Turubamba (H.A.W.); 34 Rumipamba; 35 Chillo, 8,040 ft.; 36 Llano de Cachapamba; 37 Rio San Pedro (A.); 38 Burro Potrero; 39 Rio Pita (A.W.); 40 Guangopolo (A.); 41 Conocoto (A.W.); 42 Sangolqui (A.W.); 43 Ichubamba (W.); 44 Alangasi (A.W.); 45 Cerros de Langasi y Ilalo; 46 Pifo (A.W.); 47 Tumbaco (A.W.).

B. 2. Ascent of Antisana from Quito, March 16th, 1802.

(*vide* H. B. K., Nov. Gen., vii. 380; Humb. et Bonpl., Voyage, Atlas Géogr., sér. 1, t. 26, map of Antisana).

48 **Quito**; 49 Pintac, 9,516 ft.; 50 Pinatura; 51 Volcan de Ansango; 52 Lecheyacu; 53 Llanos de Santa Lucia y Cuvillan, 12,480 ft.; 54 Laguna Mica; 55 Hacienda de Antisana, 12,624 ft.; 56 Chussulongo; 57 **Antisana**, 17,958 ft.

B. 3 Ascents of Pichincha from Quito, April 14th, May 26th and 28th, 1802.

(*vide* H. B. K., Nov. Gen., vii. 380; Humb. et Bonpl., Voyage, Atlas Géogr., sér. 1, t. 27, map of Pichincha; Atlas Pittor., pp. 291-2, pl. 61).

58 **Quito**; 59 Chorera de Cantuna; 60 La Cruz de Pichincha; 61 Valle de Cundurguachana; 62 Cerro de Lumbili; 63 Lloa Chiquito; 64 Valle de Yuyucha; 65 Verdecuchu, 13,038 ft.; 66 La Ciénaga del Volcan; 67 Llanos de Altarcuchu, 13,530 ft.; 68 Palmascuchu, 13,680 ft.; 69 Tablahuma, 14,136 ft.; 70 Cono de los Ladrillos, 14,412 ft.; 71 Guagua-Pichincha; 72 Rucu-**Pichincha**, 14,412 ft.

B. 4. Other mountain districts near and south of Quito, visited between January and July, 1802.

(*vide* H. B. K., Nov. Gen., vii, 380; Humb. et Bonpl., Voyage, Atlas Géogr., sér. 1, t. 5 (abbrev. H.); Atlas Pittor., pp. 233-4, pl. 35 (Iliniza), pp. 273-4, pl. 51 (Corazon); André in Le Tour du Monde, 1883, xlv, 388, 403, maps (abbrev. A.); Whympers, Travels amongst the Great Andes of the Equator, 1892, maps at end (abbrev. W.); Spruce, Notes of a botanist on the Amazon and Andes, ed. Wallace, 1908, vol. ii, map facing p. 220 (abbrev. Spr.)).

73 **Quito**; 74 Atacazo (H. A. W.); 75 Tambillo, 9,000 ft. (A. W.); 76 Passuchua (Pasochoa, W.); 77 Corazon, 14,856 ft. (H. A. W. Spr.); 78 Altos de Chisinche (H.) y Tiopullo (W.); 79 Machache (A. W. Spr.); 80 Ruminai (A. W. Spr.); 81 **Iliniza**, 16,302 ft.

C. Quito to Alausi and the mountains of Assuay, via Cotopaxi, Ambato and Riobamba, July, 1802. [N.B.—The ascent of Chimborazo is inserted here in its geographical position, though it was undertaken independently from Quito in June, 1802.]

(*vide* H. B. K., Nov. Gen., vii. 380, 381; Humb. et Bonpl., Voyage, Atlas Géogr., sér. 1, tt. 5 and 9, map of Chimborazo (abbrev. H.); Atlas Pittor., pp. 102–107, 200–202, pl. 16 and 25 (Chimborazo), pp. 41–47, pl. 10 (Cotopaxi), and pp. 230–2, pl. 33 (bridge of ropes at Penipe); André in Le Tour du Monde, 1883, xlv, 403 map (abbrev. A.); Whympers, Travels amongst the Great Andes of the Equator, 1892, maps at end (abbrev. W.); Spruce, Notes of a botanist on the Amazon and Andes, ed. Wallace, 1908, vol. ii, maps facing pp. 220, 310, 524, (abbrev. Spr.)).

82 **Quito**; 83 Casa del Inca de Callo (A. W. Spr.); 84 Rio Saquimala (Spr.); 85 **Mulalo** (Mulahaló); 86 Rio de los Baños, 9,540 ft.; 87 Casa del Paramo de Pansache, 11,322 ft.; 88 Cerro de Pumaaurcu; 89 Alto de Suniguaicu, 13,578 ft.; 90 Cerro de Quelendaña (A. W. Spr.); 91 **Cotopaxi**, 17,712 ft.; 92 La Cabeza del Inca-Tacunga (**Latacunga**, Llactacunga), 8,892 ft.; 93 Asiento de Hambato (**Ambato**); 94 Altos de Guacha (Gauchi, A. Spr.) y Millaflóres, 8,310 ft.; 95 Pelileo, 7,902 ft. (A. W.); 96 Altos de Igualate (A. W.); 97 Rio Patate (A. W. Spr.); 98 Hacienda de Gansce; 99 Cuchilla de Gandisava, 9,948 ft.; 100 **Tunguragua**, 15,264 ft. (A. W. Spr.); 101 Puente de Rio Puela, 7,440 ft. (A. W. Spr.); 102 Penipe (A. W. Spr.); 103 Capa Urcu (Cerro del Altar, A. W. Spr.); 104 Tapia; 105 Los Collanes (W. Spr.); 106 Valle de Achambo (Chambo, A. W. Spr.); 107 **Riobamba** nuevo, 8,898 ft.—108 Cerro de Yanaurcu (H.); 109 Calpi, 9,726 ft. (H. A. W.); 110 Cerro de Naguayachi; 111 Llanos de Luisa y Sisgun (H.); 112 Laguna Yanacocha, 12,600 ft. (H.); 113 **Chimborazo**, 21,300 ft.—114 Cerro del Condorasto (Spr.); 115 Guamote, 9,588 ft. (A. W. Spr.); 116 Llanos de Tiocaxas (A. W. Spr.); 117 Ticsan (A. W. Spr.); 118, **Alausi**, 7,488 ft.; 119 Cerro Quello; 120 Pomallacta (W. Spr.); 121 Paramo de **Assuay**, 8,988 ft.

D. Mountains of Assuay to Cuenca, Loxa and neighbourhood, and Peruvian frontier, July–August, 1802.

(*vide* H. B. K., Nov. Gen., vii. 381; Humb. et Bonpl., Voyage, Atlas Géogr., sér. 1, tt. 5, 22 (abbrev. H.); Spruce, Notes of a botanist on the Amazon and Andes, ed. Wallace, 1908, vol. ii., map facing p. 310 (abbrev. Spr.); maps of Sievers' travels in Ecuador and Peru in Petermanns Geogr. Mittheil., 1915, tt. 24, 25, 26 (abbrev. Siev.)).

122 Paramo de **Assuay**, 8,988 ft.; 123 Cerro de Sitzan, 11,622 ft.; 124 Alto de Pilches; 125 Ladera de Cadlud, 14,508 ft.; 126 Los Paredones del Inca Tupayupangi, 12,444 ft. (Siev.); 127 Pullal; 128 Cañar (Spr., Siev.); 129 Ingachungana; 130 Villa Turche; 131 Paramo de Voeste; 132 Burgay, 9,300 ft.; 133 Delay

(Siev.); 134 **Cuenca**, 8,106 ft.; 135 Los Baños; 136 Tarqui (Siev.) 137 Cumbe, 8,502 ft. (Siev.); 138 Paramo de Sarar, 11,400 ft.; 139 **Nabon**, 8,538 ft.; 140 Ingapilca de Cochapata, 8,160 ft. (Siev.); 141 Valle del Rio Uduchapa, 6,816 ft. (Siev.); 142 **Oña**, 7,560 ft.; 143 Paramo de Alpachaca, 10,200 ft.; 144 Valle del Rio Saraguru, 6,918 ft. (H.); 145 Cerro de Pulla, 9,384 ft.; 146 Valle de Vinayacu; 147 **Loxa**, 6,348 ft.; 148 Cerros de Caxanuma, Uritusinga, Rumisitana, Boqueron, Villonaco y del Montje; 149 Catacocha (Siev.); 150 **Zaruma**; 151 **Santa Rosa**; 152 Malacates (Siev.); 153 Valle del Rio Catamayo (H. Siev.); 154 **Gonzanama**, 6,438 ft.; 155 Lucarque; 156 Llano de Trigobamba; 157 Salto del Fraile; 158 Coleisaca; 159 Valle del Rio Calvas (**Rio Macara**) (Siev.).

E. Guayaquil and neighbourhood, mainly to the north-east towards Chimborazo, Jan. 9th—Feb. 15th, 1803.

(*vide* H. B. K., Nov. Gen., vii. 382; Humb. et Bonpl., Voyage, Atlas Géogr., sér. 1, t. 22; Atlas Pittor., pp. 295–6, pl. 63; André in Le Tour du Monde, 1883, xlv, 403, map; Whympers, Travels amongst the Great Andes of the Equator, 1892, maps at end; Spruce, Notes of a botanist on the Amazon and Andes, ed. Wallace, 1908, vol. ii, map facing p. 310).

160 **Guayaquil**; 161 Rio de Guayaquil; 162 **Rio Daule**; 163 San Borondon; 164 Estero del Lagarto; 165 Bodegas de **Babahoya**, 72 ft.; 166 Rio Caracol; 167 Invernadero del Garzal; 168 Ujibar.

II. In Peru.

A. From the frontier of Ecuador through the Ayavaca region to Huancabamba, August, 1802.

(*vide* H. B. K., Nov. Gen. vii., 417; Humb. et Bonpl., Atlas Géogr., sér. 1, tt. 5, 22; map of Sievers' travels in Ecuador and Peru in Petermanns Geogr. Mittheil., 1915, t. 25; vegetation map of Peruvian Andes in Petermanns Geogr. Mittheil., 1922, t. 13; but only a few of the following localities are marked on these maps).

169 **Rio Macara**; 170 Rio Cutaco; 171 Succhubamba; 172 **Ayavaca**, 8,442 ft.; 173 Olleros; 174 Aipate; 175 Santa Rosa; 176 Rio Aranza; 177 Yanta, 3,834 ft.; 178 Gualtaquillo, 3,924 ft.; 179 Rio Cachiayacu; 180 **Rio Quiros**; 181 Paramo de Guamani, 10,284 ft.; 182 Paramo de Chulucanas, 8,190 ft.; 183 Pate Grande; 184 Guancabamba (**Huancabamba**), 6,162 ft.

B. From Huancabamba to the Rio Marañon, and thence by Huambos and Hualgayoc to Caxamarca, August, 1802.

(*vide* H. B. K., Nov. Gen., vii, 381, 382, 417; Humb. et Bonpl., Voyage, Atlas Géogr., sér. 1, tt. 5, 22; Atlas Pittor., pp. 221–2, pl. 31; map of Sievers' travels in Peru in Petermanns Geogr. Mittheil., 1915, t. 24; vegetation map of Peruvian Andes in Petermanns Geogr. Mittheil., 1922, t. 13).

185 Guancabamba (**Huancabamba**), 6,162 ft.; 186 Sondorillo, 6,030 ft.; 187 Valle de Zaulaca, 4,086 ft.; 188 Sagique; 189 Laguna de Hacatacumba; 190 **San Felipe**, 5,892 ft.; 191 Chontali; 192 Colasey; 193 Pomahuaca; 194 Paramo de Yamoca, 8,340 ft.; 195 Ingatambo, 3,342 ft.; 196 Valle de Rio Chamaya (Rio Guancabamba); 197 Passo de Pucara, 3,012 ft.; 198 Las Huertas, 2,970 ft.; 199 Passo de Matara, 2,592 ft.; 200 Passo de Cavico, 2,100 ft.; 201 Sonanga; 202 Chamaya, 1,554 ft.; 203 **Choros**; 204 Tomependa, 1,158 ft.; 205 **Rio Chinchipe**; 206 Rio Amazonas (**Rio Marañon**); 207 Pongo de Rentema; 208 Puyaya; 209 **Jaen** de Bracamoros; 210 Querocotillo; 211 Guambos (**Huambos**); 212 Montan, 8,040 ft.; 213 Santa Cruz; 214 Micuipampa, 11,136 ft.; 215 Gualgayoc (**Hualgayoc**), 12,000 ft.; 216 **Caxamarca**, 8,784 ft.

C. From Caxamarca to Truxillo, between August and October, 1802. [N.B.—A few localities in the Peruvian coast-region considerably to the north of Truxillo, which were apparently visited from Loxa in July and August, 1802, are inserted here after Truxillo.]

(*vide* H. B. K. Nov. Gen., vii, 417, 418; Humb. et Bonpl., Voyage, Atlas Géogr., sér. 1, tt. 5, 22; Petermanns Geogr. Mittheil., 1910, t. 6; 1915, t. 24; 1922, t. 13 (vegetation map)).

217 **Caxamarca**, 8,784 ft.; 218 Cerro de Santa Polonia, 9,192 ft.; 219 Paramo de Yanaguanga; 220 Magdalena; 221 Valle de Santa Magdalena, 4,140 ft.; 222 Aramo; 223 Cundurcaga (Cerro de Cunturcagua); 224 Guangamarca, 7,506 ft.; 225 Contumasay (**Contumaza**); 226 Los Chorillos, 6,744 ft.; 227 Cascas, 4,110 ft.; 228 Chala, 1,272 ft.; 229 Los Molinos, and 230 San Diego, 576 ft.; 231 **Truxillo**, 192 ft.—232 **Lambayeque**; 233 **Piura**; 234 **Payta**; 235 **Tumbez**.

D. From Truxillo and neighbourhood along the coast down to Lima and neighbourhood, October—December 5th, 1802.

(*vide* H. B. K., Nov. Gen., vii, 418; Humb. et Bonpl., Voyage, Atlas Géogr., sér. 1, t. 5; Petermanns Geogr. Mittheil., 1910, t. 6; 1915, t. 24; 1922, t. 13 (vegetation map)).

236 **Truxillo**, 192 ft; 237 Guanchaco (Huanchaco); 238 Guamang (Huaman); 239 Manciche (Mansiche); 240 Moche; 241 Santa; 242 Rio Guanbacho; 243 Casma; 244 Guarney (Huarmey); 245 Patibilca; 246 Huaura; 247 Chancay; 248 **Lima**; 249 Rio Rimac; 250 **Callao**; 251 Isla San Lorenzo.

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XXV.—MISCELLANEOUS NOTES.

WILLIAM BATESON.—The death of Dr. William Bateson, F.R.S., on February 8th, 1926, is a calamity of world-wide significance. This is not the place to put on record Dr. Bateson's great contributions to biological science, especially in connection with problems of genetics ; it only remains for Kew to mourn the loss of Dr. Bateson as the Director of the John Innes Horticultural Institution at Merton, with which Institution the Royal Botanic Gardens, Kew, have been in close and very friendly touch since its creation. Dr. Bateson often visited Kew and whenever possible it was a privilege to assist him in his researches. He was always ready to give Kew the benefit of his extensive and critical knowledge. We remember with gratitude that when it was decided, in 1921, to give a course of lectures on Genetics to our Student Gardeners, Dr. Bateson was good enough to come over and deliver the first Course.

JOHN BURCHMORE HARRISON.—We learn with great regret that Sir John Harrison, C.M.G., Director of the Department of Science and Agriculture, British Guiana, died at Georgetown, British Guiana, on February 8th, 1926, on the eve of his retirement.

Sir John spent his life in the Colonial service and rendered most distinguished and valuable service not only in Agricultural and Botanical matters but also in matters relating to Chemistry and more especially to Geology.

After taking his degree at Cambridge, where he was a scholar of Christ's College, he was appointed Island Professor of Chemistry and Agricultural Science in Barbados, and his name will be always remembered in association with that of Mr. Bovell in connection with their work on seedling sugar canes resulting from the discovery of fertile sugar-cane seed.

In the year 1889 he was appointed Government Analyst and Professor of Chemistry, British Guiana, and in 1904 he became Director of the Department of Science and Agriculture on the creation of this department in the Colony.

Sir John was created a C.M.G. in 1901, and received the honour of Knighthood in 1921, and on several occasions he was specially thanked by the Secretary of State for the Colonies for his services to Tropical Agriculture. In all matters relating to the scientific development of British Guiana he took the most lively interest, and it can be said that our knowledge of the economic resources of the Colony is very largely due to him.

Sir John was keenly interested in the project, recently put forward by Kew, for the preparation of a Flora of British Guiana and furnished his Government with a very complete memorandum in support of the proposals. It is much to be regretted that he was not spared to see the proposal carried through ; but it is to be hoped that, though his counsel can be no longer sought, the Government of British Guiana will agree to the work being undertaken.

The preparation of a Flora of the Colony to which Sir John Harrison devoted to the full his great abilities, would be a very fitting tribute to his memory, especially as he had pointed out on several occasions how essential is an exact knowledge of the Flora of British Guiana for its proper economic development.

HENRY ALFORD NICHOLLS.—The death of Sir H. Alford Nicholls, C.M.G., M.D., F.L.S., so shortly after the honour of Knighthood had been conferred upon him, is a sad loss to the Island of Dominica. For nearly fifty years Dr. Nicholls had resided in the island and rendered valuable medical service, and since 1904 he had acted as Principal Medical Officer of Dominica.

It is, however, on account of Dr. Nicholl's interest in agricultural and botanical matters that Kew wishes to pay a tribute of respect to his memory.

For very many years Dr. Nicholls was a constant correspondent of Kew on Botanical and Agricultural matters affecting the welfare of Dominica and the encouragement and progress of every kind of agricultural enterprise was his chief interest, or rather recreation, whenever his medical duties would allow.

His "Textbook of Tropical Agriculture," first published in 1892—dedicated to Sir Joseph Hooker in recognition of the help and encouragement he received from Kew—has been of considerable value to planters and has passed through eight editions.

Kew possesses very many letters from Dr. Nicholls, commencing with letters to Sir Joseph Hooker prior to the year 1880, and among his earliest is one announcing the despatch of a consignment of seed of *Hymenaea Coubaril* for Kew, and suggesting that some should be sent to the East as the timber is of so much value. He also referred to his efforts to introduce *Phytelephas macrocarpa* to the island and the fine specimen now in the Botanic Garden, Dominica, is probably the result of his activities.

In all his letters he referred to plants of botanical or economic interest and Kew is greatly indebted to him for a large number of living specimens of interesting native Dominican plants, which he sent over in Wardian cases from time to time.

In addition to living plants he sent over numerous specimens of economic interest for the museum collections.

It may be added that it is no doubt very largely due to Dr. Alford Nicholls' keen interest that the Dominica Botanic Garden is perhaps the most interesting in the West Indies, since he was able to support and supplement the efforts of the Curator and ensure that he received due encouragement and the necessary financial assistance from the Government authorities.

Sir Henry, both in his medical work and in his agricultural interests, followed in the footsteps of his able predecessor, Dr. John Imray, who was instrumental in establishing lime cultivation in Dominica after the failure of the coffee crop.